

DEPARTMENT OF AGRICULTURE.

DIVISION OF POMOLOGY.

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REPORT

ON

THE ADAPTATION

OF

RUSSIAN AND OTHER FRUITS

TO THE

EXTREME NORTHERN PORTIONS OF THE UNITED STATES.

PREPARED UNDER THE DIRECTION OF THE COMMISSIONER
OF AGRICULTURE.

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LETTER OF SUBMITTAL.

SIR: The report which I herewith send you has been made with the utmost caution after having personally inspected many of the orchards in Iowa, Wisconsin, Minnesota, and more eastern States, where Russian fruits have been growing for many years. I trust that it may serve the purpose which you had in mind when you delegated me to undertake the work.

Very truly, yours,

T. T. LYON,
South Haven, Mich.

Prof. H. E. VAN DEMAN,
Pomologist U. S. Department of Agriculture.

LETTER OF TRANSMITTAL.

SIR: In obedience to your orders, the following report upon the subject of Russian and other fruits in the Northern States, has been prepared, and is herewith respectfully submitted for the information of those who are especially interested in the cultivation of fruits in the extreme northern portion of the United States.

Horticulturists in those sections have long sought after varieties of fruits which can be grown there successfully, and it is hoped that this report, prepared by one of the oldest and most expert pomologists in the country, will be found of interest and value, and that it may be of benefit to the cause of practical pomology.

Very respectfully,

H. E. VAN DEMAN,
Chief of Division of Pomology.

Hon. NORMAN J. COLMAN,
Commissioner of Agriculture.

THE ADAPTATION OF RUSSIAN AND OTHER FRUITS TO THE EXTREME NORTHERN PORTIONS OF THE UNITED STATES.

CLIMATIC INFLUENCES.

At the extreme east, Maine stretches northward as far as latitude $47^{\circ} 32'$, while adjacent, at the west, New Hampshire reaches $45^{\circ} 11'$, and Vermont and New York extend only to 45° . Still, as the distance from the ocean increases, and the elevation is also necessarily increased, the extremes of both summer and winter temperature become greater, while the rain-fall is preceptibly diminished.

From eastern New York westward, the north line of the United States drops rapidly down to the region of known and successful fruit culture, and seems not to require discussion for the present purpose till we reach Michigan; along the easterly shore of which State the national boundary trends almost directly northward. Still the climatic influences are so far modified by the adjacent waters that, throughout what is known as the lower peninsula of Michigan, almost without exception, the climatic peculiarities likely to affect the culture of at least the hardier fruits compare favorably with those of central New York and southern New England. Such climatic conditions do not undergo essential change till after passing to the upper peninsula, about latitude 46° ; and not fully, even then, till after passing westward of the more direct influence of winds from off the waters of lakes Michigan and Superior.

Throughout the Michigan portion of the northern peninsula the influence of the waters of Lake Superior is unmistakably felt in the temperature of the winds coming across them; while they may doubtless be assumed to exert a very considerable influence upon the climate of northern Wisconsin, so far especially as northerly and northeasterly winds are concerned.

Passing westward from Lake Superior, Minnesota extends north to the national boundry in latitude 49 degrees, as do also the Territories of Dakota and Montana, east of the Rocky Mountains, as well as Idaho and Washington Territory upon the Pacific slope.

As we pass westward, beyond the influence of Lake Superior, the climate undergoes a gradual modification beyond that chargeable to mere increase of latitude, becoming subject to the unmitigated influence of polar storms in winter, with their extremes of cold; and, in turn, in

summer, to the dry atmosphere of the Plains, with increased liability to droughts, which not infrequently are of extreme severity.

The diminished percentage of atmospheric moisture westward of the Lakes is also very noticeable, becoming less as we pass westward till we approach the crests of the Rocky Mountains, beyond which, in Idaho and eastern Washington, similar conditions of dryness exist, till we reach the Cascade Mountains—a continuation of the Sierra Nevada range—west of which a mild climate occurs, with a copious rain-fall.

In Idaho, irrigation is believed to be more or less important to successful fruit culture, since by means of this the business becomes, to some extent at least, independent of climate. In eastern Washington the general conditions are understood to be similar to those of Idaho, although in both the general temperature is milder than in the same latitude east of the Rocky Mountains, while as we approach the Pacific extreme cold rarely if ever occurs.

Fruit culture west of the continental divide, in the latitude of Idaho and Washington Territories, is yet in an undeveloped state, and the capacities of these regions in this respect are but imperfectly understood. The discussion of the subject will therefore be mainly confined to the regions eastward of the Rocky Mountains. Westward of Iowa and Minnesota very little is yet certainly known respecting the adaptation of the country to the cultivation of fruits, except perhaps in eastern Nebraska, where the pomology assimilates closely with that of northern Missouri and Iowa. The probabilities, therefore, so far as the regions farther west are concerned, will be mainly expressed by results in the States of Iowa and Minnesota.

FRUITS ADAPTED OR ADAPTABLE TO A NORTHERN CLIMATE.

Of the fruits more or less perfectly adapted to successful cultivation in the region under consideration it will only be necessary to consider those which are, or promise to be, of value either commercially or for domestic or culinary purposes. Among these, named as nearly as practicable in the order of their maturity, will be found the Strawberry, Raspberry, Dwarf Juneberry (Serviceberry), Cherry, Currant, Gooseberry, Blueberry (including the Huckleberry), Blackberry (including the Dewberry), Mulberry, Cranberry, Apricot, Plum, Peach, Apple, Quince, and several nuts.

THE STRAWBERRY.

This fruit is said to be indigenous as far north as Behring's Straits, and is successfully grown in all the settled parts of the region under consideration. Few other fruits, however, vary so greatly under changes of soil and climate, so that the success of a variety in a given locality can only be certainly ascertained through actual trial. Experience, therefore, must necessarily be the surest guide to the choice of varieties for a given locality. No better rule can probably be devised for the selection of varieties for an untried locality than to select those

that most nearly approach the native type in character, and especially in hardness of their foliage, since such may be expected to better withstand the hardships of this northern climate; although even these will doubtless require the shelter of mulch during winter, unless the snow shall suffice for the purpose.

Probably in no other class of fruits has there been a more utter blending or mixing up of original classes or families by continued cross-fertilization. Hence there must necessarily be much difficulty in the selection of pure varieties for additional crossing, as well as uncertainty in the selection of desirable varieties for planting from the indications of their foliage. Still, a thick, coriaceous foliage may in this, as in the larger fruits, be fairly assumed to indicate ability to withstand extremes of temperature, as well as of aridity.

It is also highly probable that the necessity which, in case of the tree fruits, has compelled a resort to reproduction for the origination of varieties capable of withstanding the trying climate of the extreme North, will be found more or less desirable in the case of the strawberry; since, although indigenous, it naturally occurs in sheltered situations, while under cultivation it is usually void of such protection.

At the East there are few, if any, indications of essential differences of experience between the northern and southern portions of New England so far as the varieties of the strawberry are concerned, although it may fairly be assumed that protection, either by mulch, or by a covering of snow, will become more and more essential as we go northward, while, other circumstances being equal, the same varieties will, as the rule, be found similarly successful in both regions.

At the Northwest, however, the diversity, as well as the severity, of the climate is far greater, to which may be added the fact that throughout much of this region there is practically little experience upon which conclusions may be based.

The reports and recommendations of growers in these regions, moreover, afford indications that they are made mainly from the market standpoint of mere profitableness, rather than from that of the grower for family or amateur purposes. Be this as it may, the varieties most highly commended for planting throughout the region are almost exclusively those more generally commended elsewhere by growers for the market.

Selecting from these the twelve most generally recommended for planting in Wisconsin, Iowa, Minnesota, Dakota, and westward, their relative popularity is found to be, as nearly as may be, in the following proportions: Crescent, 35; Wilson, 19; Glendale, 12; Charles Downing, 11; Manchester, 10; Phelps (Old Ironclad), 10; Vick, 8; Captain Jack, 7; Downer, 7; Cumberland, 4; Countess, 3; Kentucky, 2.

The fact that occasionally the Crescent (usually considered pistillate) is the only variety recommended in many cases, thus leaving it destitute of a pollen-supplying variety, would seem to justify the suspicion that the recommendations may not in all cases have been made

with due deliberation ; while the notable omission of varieties generally recognized as representatives of quality, and hence adapted to supply the requirements of discriminating tastes, may be supposed to indicate a too-general control of the societies in the regions in question by purely commercial growers.

In Minnesota the growing of this fruit for market purposes has been found profitable as far north as Moorhead and Glyndon, about latitude 47 degrees north, where a seedling has been originated which proves so valuable, that it has received the name Manitoba Wonder.

THE RASPBERRY.

Of this fruit, two native species only—*Rubus strigosus* and *R. occidentalis*—are recognized as possessing economic value, so far as their fruits are concerned. The European *R. Idæus* is found to be incapable of withstanding the extreme heat, cold, and aridity of most American climates.

Strigosus, in its wild form, exists in abundance from the Great Lakes to the sea-board and northward, where it is generally protected against extreme cold by an ample covering of snow.

Philadelphia, Clarke, Herstine, Cuthbert, Hansell, Superb, Turner, and Marlboro, supposed to be seedlings of this species, and also various others, some of which are partially or wholly of *Idæus* parentage are, or have been, more or less popular. Those of native origin may be expected to prove more or less successful even upon the Western plains, with irrigation where moisture is deficient, and with artificial protection where snow is uncertain.

Occidentalis has a more limited range northward. Its stronger and taller growth subjects it more fully to the influence of extreme cold, while its less flexible canes render its artificial protection more difficult. It can scarcely be expected to succeed at the extreme North, except by the employment of effective means for winter protection.

With this precaution, almost any of the popular varieties, such as Doolittle, Souhegan, Tyler, Ohio, Hopkins, Gregg, and many others, may be expected to prove reasonably successful.

There is also a class of varieties, among which are New Rochelle, Shaffer, and others, possessing the habit of *occidentalis*, but with fruit in color and quality intermediate between this and *strigosus*, which, by many are supposed to be hybrids, and which may be expected to succeed at the North under treatment similar to that suggested in the case of *occidentalis*.

The varieties of this fruit relied on at the extreme North are mainly those which are also popular farther South, although several seedlings of the region are locally commended and planted. At Menominee, Wis., on the northwesterly shore of Green Bay, report says that all raspberries must be covered in winter, while at Stonewall, Manitoba, Mr. Thomas Frankland, of that province, states that black-caps are grown without protection. This, if true for that locality, must very probably be due to an ample covering of snow in winter.

The popularity of varieties, as indicated by reports of societies and the commendations of growers, is expressed in the following figures:

Blackcaps.—Gregg, 10; Doolittle, 7; Tyler, 7; Mammoth Cluster, 6; Souhegan, 4; Nemaha, 2; Ohio, 2; Golden cap, 1; Beebe's Golden, 1.

Varieties of strigosus.—Turner, 23; Cuthbert, 14; Philadelphia, 6; Marlborough, 5; Hansell, 4; Brandywine, 3; Crimson Beauty, 2; Thwack, 1; Reliance, 1; Clarke, 1; Superb, 1.

Supposed hybrids.—Shaffer, 9; Caroline, 1.

DWARF JUNE BERRY.

The dwarf juneberry (*Amelanchier canadensis*, var. *rotundifolia*), occasionally known as service berry or shad bush, is occasionally planted, and has been, by some persons, sold to planters as blueberry or huckleberry, to which the fruit has considerable resemblance, although far less desirable so far as productiveness and quality are concerned.

The plant is of easy cultivation, and entirely hardy, being indigenous at the extreme North. In one of its forms it becomes a tree 20 to 30 feet in height. In this form the tree is usually less productive and the fruit smaller.

Professor Budd, in 1886, states that while it is a great favorite with birds, "when grown in large quantities, say 2 or 3 acres, what the birds will take will hardly be missed; but in small lots it will probably not be profitable. * * * We have at the college about twelve distinct species, from Germany, Central Asia, and Russia. They are all small, from 2 to 4 feet in height, and some of them very fine."

THE CHERRY.

Our improved varieties of the cherry are reputed to have sprung from a wild species, botanically known as *Prunus avium*, which is supposed to have been the parent of our modern Heart, Bigarreau, and Duke varieties, and from *Prunus cerasus*, from which are supposed to have originated the Morellos.

The former can not be considered hardy, either north or west of southern New England and New York, and only partially so in southern Michigan; while from one cause or another the entire class utterly fails farther westward and northward.

The Morellos, which in average seasons have been at least partially successful in the latitude of northern Illinois and central Iowa and to some extent even farther north, were sadly injured during recent trying winters, compelling the conviction that for the regions northward and westward their failure may fairly be deemed a foregone conclusion, except, perchance, in specially-favorable localities.

Within comparatively a few years several varieties, among which may be named Leib, Ostheim, Wragg, and perhaps others, have been put forward as having successfully withstood these trying paroxysms, and for this reason have attracted much attention. Upon inquiry, several,

if not all, of these are reputed to have been incidental importations from central or eastern Europe, and to have inherited their hardiness from the typical varieties of those regions.

Under these circumstances the Iowa Agricultural College, through J. L. Budd, its professor of horticulture, made a careful study of the cherries of central and eastern Europe during the summer of 1882, together with comparisons of the climate with that of Iowa and the adjacent regions.

Becoming assured that certain of the typical cherries of Silesia, Poland, and southern Russia were superior in quality to those heretofore successfully grown in Iowa, and, moreover, that the similarity of climatic conditions warranted the hope that they would also prove successful here, and also, upon similar comparison, that certain varieties or types of this fruit from Vladimir and Kazan, still farther north, might be expected to withstand the climate of central and northern Minnesota and Dakota, during the spring of 1884 about forty varieties of cherries were successfully imported from those regions, planted in orchard at the college, and their propagation commenced for the purpose of distribution and trial in the Northwest.

It is by no means warrantable to assume, in advance of thorough trial, that these novelties are to be relied on to supply the existing need, although a very recent examination, not only of the original trees planted in the orchard at the college, but also of those now in nursery there, made since the extreme heat and drought of the past summer (1887), shows their growth to have been strong, while the rich, glossy foliage was as healthy and perfect as could be desired, thus pretty thoroughly demonstrating the fact of their sufficient hardiness in this latitude, together with their ability to resist the depletory influences of extreme aridity.

The effect of the change of ten or fifteen degrees of latitude upon their productiveness, and possibly even upon the quality of the fruit, can only be certainly determined by their actual fruitage through perhaps a series of years.

Uncertain as the result of this experiment must, so far, be considered, it seems to offer the chief apparent prospect for a home supply of this desirable fruit for the extreme North and Northwest east of the continental divide.

Of the varieties thus imported and on trial on the college grounds, Professor Budd lists and describes Vladimir, Bessarabian, Lutovka, Nos. 23, 24, 26, and 27, Orel; the varieties given by numbers being of the Bessarabian race.

Another class of varieties, which are designated as the Ostheim Weichsel family, includes Strauss Weichsel, Frauendorfer Weichsel, Susse Früh Weichsel, Späte Amarelle, Griotte Précoce, Griotte Douce Précoce, Griotte de Ostheim, and Cerise de Ostheim.

He also describes the following as being of mixed race: Brüsseler Braune, Shatten Amarelle, Königliche Amarelle, Vilna Sweet, Doube

Natte, Amarelle Bunte, Fouché Morello, Herozog's May, Herzformige Weichsel, Lithauer's Weichsel, Sklanka, Red May, Red Muscateller, June Amarelle, Amarelle Bouquet, Griotte du Nord, Grosse Lange, Double Yellow Spanish, Glaskirche Kurzstielige.

While the professor deems it probable that several of these may not succeed above the latitude of southern Iowa and northern Illinois, he is yet of the opinion that others will prove hardy enough for central and even northern Wisconsin, Minnesota and Dakota—a region in which the only indigenous representatives of this fruit are the worthless Sand or Mountain cherry (*Prunus pumila*) and the Choke cherry (*P. Virginiana*).

The most successful variations of this fruit in the settled portions of the Northwest, as indicated by the reports of societies and the preferences of planters, are indicated by the numbers attached to names of varieties, as follows :

Early Richmond, 11; English Morello, 9; Wragg, 5; Ostheim, 5; Late Richmond, 3; Montmorency, 3; Vladimir, 1.

Dr. T. H. Hoskins, of northern Vermont, in the American Garden, says :

"The Kentish cherries, early and late, with several of the Dukes and Griottes (Mazzards) endure even our hard winters, and sometimes become quite large trees, yet rarely produce a full crop of fruit. * * * We are hoping much from the recently-imported Russian, Polish, and north German cherries and plums; but in order to get high quality, in addition to hardiness of tree and bud, the same work of crossing may be necessary as in the cases of the pears and apples. That good results can be realized in a reasonably short time in such experiments has been frequently proved; and a great field is open for those rightly situated, who will enter upon the work seriously and follow it up perseveringly."

THE CURRANT.

Both the Black currant (*Ribes nigrum*)—a native of northern Europe and Asia—and the Red currant (*Ribes rubrum*)—a native of northern America—will doubtless be found abundantly hardy at the extreme North; at least when given a shady location, and assisted by irrigation in regions in which moisture is deficient. Both are of extreme northern origin, and will doubtless be found proof against injury from low temperatures.

The Missouri Currant (*Ribes aureum*) is valued chiefly for ornamental purposes. It is found wild in Kansas, and also as far northward as Dakota, and if not indigenous, it must have been introduced there at a very early period.

The white currants are considered to be mere varieties of the red currant.

Naming them in the order of their apparent popularity, numbers are attached to indicate the relative values; as indicated by reports and discussions:

Red Dutch, 13; Fay, 12; White Dutch, 9; White Grape, 9; Victoria, 9; Cherry, 7; Long bunched Holland, 6; Black Naples, 5; Stewart, (a local seedling), 2; Lee (black), 1.

THE GOOSEBERRY.

This fruit, also known botanically as *Ribes*, is essentially American and northern in its habitat; appearing on this continent under several forms. The single English species *Ribes reva-crispa*, so generally grown in England as a garden fruit, is believed to be the only species of European nativity. It proves unable to withstand the heat and aridity of our American climate. In the cool, moist climate of England it has sported into a great number of varieties, some of which are of very large size.

Comparatively slight improvement has, so far, been effected with those indigenous to America. Among the improved varieties from this source are Houghton and Mountain seedlings. Downing and Smith are more recent originations, of larger size; which give indications of a possible hybridization with the European species.

Industry is a very recent introduction to American growers. It is an alleged seedling of the European species; but is said to be so much less liable to mildew, as to warrant the hope that it may prove adapted to this climate. Its permanent exemption is, however, still a matter of doubt.

Even the purely native Houghton occasionally, under unfavorable conditions, is found to suffer from mildew; which is the chief obstacle to the success of the European species here.

The improved natives, including Downing and Smith, are abundantly hardy in central Minnesota; although at Minneapolis the Downing, for some cause not understood, has shown a lack of productiveness. There can, however, be little doubt of the success to the American varieties at the North and West, if grown in shaded situations, with the requisite conditions of coolness and moisture. Houghton, Downing, and Smith are the varieties which seem to be more generally popular. The gooseberry is now, however, extensively grown in the Northwest.

THE BLUEBERRY.

The Blueberry (*Vaccinium*) (which formerly included the Huckleberry, now *Gaylussacia*), is so peculiarly exacting as to soils and surroundings, that but rare, and generally ineffectual, attempts have been made to subject it to cultivation and improvement; although few of the smaller fruits are more highly valued where it is known and accessible. It is essentially a Northern plant, and the fruit is abundantly produced in the region of the Great Lakes, and eastward to the sea-board.

Some, at least, of the various species occur farther west, in localities in which suitable soils and other needful conditions occur.

THE BLACKBERRY.

The Blackberry (*Rubus villosus*) and its near relative, the Dewberry, (*Rubus canadensis*) are indigenous throughout the northern States, gen-

erally in partially-sheltered locations, or in tracts of land but recently burned over.

From such localities immense quantities of this fruit annually find sale in the markets of large cities and towns. The fruit thus so produced has been so abundant that, until recently, little attempt has been made to improve it, and this little mainly by selection of choice seedlings. A few of those most likely to prove hardy enough for the North and West are Snyder, Taylor, Stone, Wallace, Western Triumph, Ancient Briton, and perhaps a few others.

The habit of the plant is to produce its fruit-buds for the ensuing crop near the top, where the injury in winter is most likely to occur, with the frequent result of a partial, or possibly of an entire, loss of the crop of fruit. Even the so-called hardy varieties are by no means entirely exempt from such loss when fully exposed during winter. In fact, when it is recollected that the blackberry is naturally an undergrowth, we may be allowed to doubt if, with the habit of fruiting already mentioned, there is ground for hope that a variety capable of withstanding a full exposure during occasional crucial winters is even among the possibilities.

If in the more moist and equable climate of the region of the Great Lakes it is found practicable and profitable to protect the fruiting canes in winter, there must doubtless be increased occasion for such practice in the drier atmosphere and severer winter temperatures farther west and north, where quite probably, even with the hardiest varieties, the plants may require to be well covered with snow, mulch, or earth, to avoid the alternative of a loss of the crop of fruit. The low spreading habit of the Taylor, Stone, and perhaps others, is advantageous for such purpose; while the stout upright growth of many others increases the liability to break the canes in the process of laying down.

The trailing habit of the dewberry would, in a snowy region, insure an ample covering; while, if needful, they may be easily covered with earth or mulch.

There are several varieties before the public; but of those [disseminated and fully tested, the *Lucretia* is the only one that has received general and satisfactory indorsement.

The following varieties are more or less grown in the Northwest; the numbers indicating their relative popularity:

Blackberries.—Snyder, 21; Ancient Briton, 11; Stone, 7; Taylor, 2; Thornless (?), 2; Kittatinny, 1; Wallace, 1.

Dewberries.—*Lucretia*, 4, and a local seedling yet unnamed, discovered by Dewain Cook, of Windom, Minn.,* 1; also one recommended at Sparta, Wis., as productive and excellent, 1.

THE MULBERRY.

The Black mulberry (*Morus nigra*), said to have originated in Central Asia, and to have been introduced into southern Europe more than a

* This variety has recently been named Windom.—H. E. VAN DEMAN.

thousand years ago, is reputed to be the parent of what is now known as the Russian Mulberry, which is the only species requiring notice in this connection.

Having been introduced into the West by the Mennonites who emigrated from Russia, it has manifested a degree of hardiness superior to that of any other mulberry. Its limit northward on this continent can not yet be said to have been determined.

The fruit can not be said to possess any special present value, and its prospective importance must depend upon the chance of improvement by new originations from seed. Even in this direction the probability of improvement is apparently very remote.*

THE CRANBERRY.

The Cranberry (*Vaccinium macrocarpon*) belongs exclusively to the North, where it assumes much importance as a commercial fruit. It is largely grown for market from New Jersey northward to and including the British provinces. The business in New Jersey and Massachusetts is mainly confined to the sea-coast.

Michigan, Wisconsin, and Minnesota possess superior natural advantages of both soil and climate for the purpose; and, although in these States the interest is less fully developed, the production of this fruit here is being rapidly increased.

Many marshes throughout both peninsulas of Michigan were naturally well stocked with the cranberry; and, although during the settlement and development of the State many of these have been drained and converted into arable land, large tracts are still in their pristine condition. In Berrien and Ottawa Counties, and probably elsewhere, considerable tracts have been prepared and stocked with the vines with profitable results, and the business seems likely to increase.

Probably the most extensive plantations are to be found in Wisconsin. It is estimated that in four counties in the central part of this State there are fully 50,000 acres of marsh adapted to the growth of this fruit, much of which is already in process of improvement for this purpose. The usual process here seems to be to clear the ground of brush, and by partial drainage to enable the plants to take possession of the soil, which they are said to do within a comparatively short period, thus avoiding the expense of preparing and planting the ground and cultivating till the plants have covered the surface.

A tract of 1,080 acres, owned by a company who have already invested a considerable sum thereon, is being improved upon the following plan: At the upper side of the marsh a reservoir of ample capacity is created by digging a ditch across the slope (which is very slight), throwing the earth upon the upper side, thus constructing an embankment or dam, with sluices and flood-gates at convenient points, by means of which the water may be accumulated and turned upon the space below at pleasure.

*All of the many varieties I have observed in several Western States were too small and poorly flavored to be valuable except as bird feed.—H. E. VAN DEMAN.

Below, and at right angles with the embankment already spoken of, a ditch is dug nearly centrally through the marsh of sufficient capacity to receive the waste and surplus water. The earth from this ditch is used to construct an embankment upon each side thereof; and the water therein is maintained at a depth and width sufficient to float a small flat-boat, which is employed for transporting material, as well as for collecting the fruit when picked. The lower end extends to and within a building, which serves as a storage and packing room for the fruit when picked and awaiting transportation.

The marsh below the reservoir is cut up by side and cross ditches into blocks of five or more acres, each of which is capable of being separately flooded from the reservoir and ditches above by means of sluices, as already described.

When a new block has been prepared the sluices entering it are left open, and it is kept flooded during the growing season, with the result that the trees, shrubs, and bushes growing thereon are killed. The sluices are then closed, the trees and brush, if any, removed; and the cranberries that may be already thereon left to take full possession. In case of a block not sufficiently stocked with natural plants for the purpose, the ground is carefully fitted as for a farm crop; a lot of rooted plants are cut into sections, which are sowed and harrowed in, in the usual manner of farm-sowed crops; usually with a favorable result.

Little seems to be known respecting the status of cranberry culture in Minnesota, beyond the fact that the fruit is indigenous and abundant in its wild state, and that a very considerable amount is supplied to commerce.

That it is less abundant in the wild state in Dakota and Montana can scarcely be chargeable to unfavorable climate, but rather to a lack of the peculiar conditions of soil and moisture indispensable to the growth and prosperity of the plant.

Mr. E. Reeves, of Waverly, Iowa, in a report to the State Horticultural Society for 1886, page 152, says, "The Highland cranberry (*Viburnum opulus*) is not grown as much as it should be. It is a native of our part of the State and is perfectly hardy. It does best on a moist soil, is readily grown from cuttings, and bears good crops of fruit, nearly equal to that found in the markets."

The plant is indigenous as far north as British America, but is usually accounted but a poor substitute for that already described. This fruit, however, seems quite unlikely to become a competitor of the ordinary cranberry.

THE APRICOT.

The Apricot (*Prunus Armeniaca*), is reputed to be a native of Armenia, and to have been brought into southern Europe in the time of Alexander the Great.

Seeds of a species (or variety?) differing, at least in hardness, from the varieties of southern Europe were brought to this country from

southern Russia by the Mennonites some years since. These have been generally reproduced in this country, and considerably disseminated as seedlings, which are found to vary greatly in quality. More recently some Western nurserymen have made selections from the best of these and have undertaken their propagation.

The apricot has hitherto proved to be so uncertain a fruit at the North, that a variety of even tolerable quality, that shall prove successful north of the Middle States, will no doubt be welcomed as an acquisition. It must, however, be admitted that the question of the value of this new introduction anywhere in this country or for any purpose is yet to be decided; while it can scarcely be hoped that it will succeed north of central Iowa, and possibly some portion of southern Michigan, where in favorable situations the more common varieties of this fruit fail more especially on account of very early blooming.

Professor Budd, of Iowa (who is by some persons thought to be occasionally excessively enthusiastic respecting the prospective value of Russian fruits), says in a bulletin of 1885:

We find not in Russia, however, any varieties of the apricot equal to their best plums. We believe the best apricots of the world, for our climate, are to be found in north Bokhara and northwest China, [adding] We are sending out for trial plants of a variety from the hill country northwest of Peking, China, which seems specially promising for the parts of the West south of the forty-first-parallel.

Among those thus named, propagated, and catalogued are the following six varieties introduced by Carpenter & Gage, of Nebraska: Alexander, Alexis, Budd, Catharine, Gibb, and Nicholas.

The following additional varieties are believed to have been selected and introduced by A. H. Griesa, of Kansas, viz: Byram, Evatt, Preib, Remer, and Smith.

Although these have ostensibly been selected for propagation as stated, little is yet known of them beyond what is stated by their introducers. Their real value must depend almost wholly upon the results of extensive trial over an extended region.

THE PLUM.

The cultivated Plum of the Northern States (*Prunus domestica*), which, according to Dr. Gray, is supposed to have sprung from the Sloe, is an introduction from Europe. It proves hardy and successful from New England westward to and including the lower peninsula of Michigan, although almost universally attacked by the curculio, which usually ruins the fruit, unless efficient means are employed to save it.

The fruit is also, in many localities, attacked by what is known as "the Rot," which appears to be either accompanied or caused by fungus, which manifests itself in connection with the decay, which usually occurs just prior to the season of maturity, often ruining nearly or quite the entire crop of fruit.

The foliage is also frequently attacked, toward the end of summer,

by a malady which causes the premature ripening and dropping of the leaves, leaving the fruit but partially grown and the wood yet immature, in which case the tree is often either injured or killed by the cold of the following winter. By some persons this malady also is attributed to the attacks of a minute or microscopic fungus, although no sufficient examination is known to have been made to determine the question.

The branches, and occasionally even the trunk, of the tree are also liable to be attacked by a fungus known as Black Knot, and botanically as *Sphæria morbosa*, which occasions unsightly protuberances, and, if neglected, is quite sure to ruin the tree, but which may generally be overcome by the prompt cutting away and burning of the diseased parts, to prevent the dissemination of the spores.

These various maladies have proved so serious, that in many localities once considered favorable, the growing of this species of plums has been nearly or quite abandoned; although in the northern portions of lower Michigan, in portions of the more easterly States, as well as in Canada eastward of the Great Lakes, either from more favorable climatic influences or because the inducing causes have not yet reached them, this fruit is still abundantly successful; becoming in such localities not infrequently a very considerable source of revenue.

Farther westward, either from lower extremes of temperature or a more arid climate, or possibly from a combination of the two, this species of plum fails almost wholly.

The native plum of the South (*Prunus chicasa*), grows in the wild state in Kentucky and southwestward; and in those regions seedlings of this, among which may be named several known by the common title Wild Goose, have been found productive and profitable under cultivation. These have been tested at the North and found abundantly hardy; but, although they often bloom freely there, either from imperfection of the bloom or from other and unknown cause they almost invariably prove obstinately unproductive, and hence worthless, unless, as some have been led to hope, this defect can be remedied by the adjacent planting of other pollen-producing varieties—a hope which as yet lacks the confirmation of actual authentic experience.

The native plum of the North (*Prunus Americana*), is indigenous from about latitude 38° northward, far beyond the limits of the United States. It is quite at home in the lowest lands and along the margins of streams where the lowest range of the thermometer is known to occur. It is always abundantly, if not excessively, productive; and even in the regions in which the *domestica* varieties are most liable to the attacks of the curculio, this species mainly escapes; while in the specimens which bear the mark of the Little Turk, the larvæ very generally fail to develop.

D. B. Wier, of Illinois, advances the hypothesis, which he insists is borne out by his own experience in the growing of this fruit, that while the curculio freely punctures this class of plums, the larvæ very rarely develop; and upon this circumstance he bases the conclusion that the

growing of our native species would probably result in the extermination of the Little Turk.

Although this species in its wild state can not be said to be of high quality, its productiveness, hardiness, and freedom from disease, seem to have directed attention to it as a possible source of improved varieties. So far as is known, the only improvement as yet has been by selection. Even by this mode several desirable varieties have already been discovered; some of them, at least, possessing qualities which in value, nearly approach the popular varieties of the *domestica* species. Among these may be mentioned De Soto, Wolf, Rollingstone, and Wyant, which are on trial and being disseminated by the Iowa Agricultural College; also Miner, Bassett, Climax, Forest Garden, Rockford, and other promising newer sorts in process of propagation and introduction. To the foregoing may be added Weaver, introduced several years since, and Pottawatamie, now just introduced. The last two are said to be productive in Iowa, where they originated. In Michigan, with but a limited trial, Weaver shows a lack of productiveness.

There is little occasion to doubt the success of plums of this *Americana* species throughout the Northwest, at least eastward of the Rockies, except, possibly, where the failure shall arise from a lack of the needful moisture in the soil.

In his General Notes on Foreign Plums, in bulletin of 1882, Professor Budd says:

The varieties of really good plums, for dessert and culinary purposes, grown in Russia will be a matter of surprise to visitors. Even as far north as Moscow and Kazan plums of fine size and quality are grown in great abundance. We have introduced a number of fine sorts which we are propagating and sending out for trial. Their success with us will not hinge on their hardiness or tendency to produce fruit, but on their relative exemption from attacks of the curculio. We have much reason to believe that such sorts as the Red and Yellow Arab, Moldavka, Hungarian, Long Blue, Long Red, Long Yellow, and Skorospelka will not be injured by the Little Turk to a greater extent than our native sorts, as, like them, they start the fruit late, and it is developed with great rapidity. In no line of our experimental work do we expect more useful results than in our trial of the best Russian plums.

Although the foregoing was published more than two years since, it is not known that any of these plums have even yet fruited in this country. The effect, therefore, if any, of so wide a departure in longitude, and the probably more marked result of a transfer southward of 14° of latitude, are yet to be determined; and since the professor fails to clearly indicate the premises upon which his expectations have been based, there is no apparent alternative but to wait and hope for the desirable results which he seems so confidently to anticipate.

In the transactions of the Iowa Horticultural Society for 1886 the professor says:

Of the Russian plums which I am testing I can say but little as yet; some of them are of the Lombard type in appearance. Our native varieties seem to do well, such as Bassett, De Soto, Climax, Forest Garden, and Weaver. The last named does not seem very productive. The Robinson and Mariauna I have not tried long enough to speak intelligently about.

In the same volume, at page 437, Mr. Burton advances the idea that—

The Miner plum [why not others also—WRITER] ripens its pollen before the stamen is ready to receive it. This difficulty could be obviated by planting another plum adjacent, which ripens its pollen at just the right time.

Some indication of the varieties of plums under cultivation in this region may be gathered from the following list. Their apparent relative popularity is indicated by the numbers attached:

De Soto, 29; Forest Garden, 17; Miner, 15; Weaver, 9; Wolf, 7; Wild Goose, 7; Rolling-stone, 5; Maquoketa, 4; Cheney (the earliest), 2; Newman, 2; Speer, 2; Marianna, 1; Robinson, 1; Harrison's Peach, 1; Moore's Arctic, 1; Van Buren, 1; Winnebago, 1; Rockwell, 1; Shaffer, 1; Lombard, 1; Shipper's Pride, 1; Clemmons, 1; Oglesby, 1. Several of these are recent introductions, and not generally known and tested.

THE PEACH.

The Peach (*Amygdalus Persica*) is reputed to be a native of Persia, and to have originated from the almond. The Nectarine is usually considered to be merely a variety of the peach with a smooth skin. It is known, in fact, that within a recent period certain existing varieties of the nectarine have been originated from seed of the peach.*

The limit northward of the peach-growing region proper at the East may be said to be about latitude 42°; although near the sea-coast, and also in New York and in portions of Ontario, the ameliorating influence of the ocean and of Lake Ontario carry it somewhat above 43°. Farther west, in Michigan, it extends yet farther north; within the more immediate influence of Lakes Michigan and Huron even as far as latitude 45° 30'. Farther west, and away from the influence of the Great Lakes, the limit of the profitable cultivation of this fruit occurs much farther south, probably even below latitude 40°, or in southern Illinois and northern Missouri.

At the northwestward of Lake Michigan the peach, therefore, can only be grown as an exotic. There have been various efforts to devise some cheap and effective process for the protection of the tree against the extremes of cold during winter, which occasionally ruin the fruit-buds and even the trees. So far, however, nothing effective has been devised short of actually laying down the trees and covering them with earth during the winter.

Prof. J. L. Budd, in the course of his experiments with hardy European fruits, has imported from eastern Asia what he hopes may prove a hardier type of this fruit. In a college bulletin issued in 1885 he says:

The peach does not vary as much in hardiness of varieties as the other orchard fruits of the temperate zone. In our experiments we have used the Wager and Hill's Chili as a standard of hardiness of the old varieties, coming originally from Persia.

* This I have done repeatedly on my own farm in Kansas.—H. E. VAN DEMAN.

Four years ago we imported plants of eleven varieties of the peach from Pekin, China, they having been procured for our use from the hill country northwest of Pekin. They have larger, thicker leaves than our common sorts, ripen their wood earlier in fall, and have proven 30 per cent. hardier than our old sorts. Plants we have sent out for trial have stood well in south Iowa, north Missouri and Kansas. Some of them will prove valuable on the northern borders of the peach belt.

Two years ago we received pits of the peach from Riga, Russia, said to have been brought from Central Asia. The plants are now two years old, and show marked variation in leaf, bud, glands of leaf, and habit of early ripening of wood, from the old varieties originally from Persia.

We are now trying to secure pits from north Bokara, in Asia, the most extreme climate, so far as I know, where the peach is grown. The most we expect to do in this line is to make peach-growing possible on the northern borders of the present peach belt.

A peach, said to be a native of China, and known as Tong-Pa, is reported to have been a couple of years on trial in Iowa County, in eastern Iowa; but with so short experience, no conclusion has yet been reached respecting its probable value for that locality.

Peter M. Gideon, of Excelsior, Minn., has a small plantation of bearing peach trees, planted with reference to laying down and covering with earth in winter. In August, 1887, these were in thrifty condition, and carrying some fruit; having apparently been three or four years planted, and from 8 to 10 feet in height.

THE GRAPE.

The Grape (*Vitis*) is represented in Europe only by the single species *vinifera*, although since the advent of the phylloxera in the grape-growing regions of that country importations of American species have been freely made, with the hope that, by their more robust habit, they may prove better able to resist the attacks of this new enemy. This species proves obstinately unsuccessful throughout the eastern United States. A very considerable number of our improved American varieties have nevertheless become tainted with this strain by hybridization, and many of these seem to have derived desirable qualities from this source; although generally, if not always, with increased tendency to suffer from mildew—the chief enemy of the *vinifera* class in this country.

Of our American species, *Vitis cordifolia*—the northern Frost Grape—is indigenous far northward of the United States. By modern botanists this is blended with or included in *riparia*.

Vitis labrusca—the indigenous wild grape of New England—becomes more rare as we proceed westward, occurring very rarely in western New York and Michigan; and, it is believed, wholly disappearing, as an indigenous growth farther west.

Vitis astivalis can only be said to be indigenous south of the region under consideration; though occasionally extending sporadically into its southern portions.

Within the past thirty or forty years, in the process of improving our native grapes by reproduction and bringing them under cultivation

while there yet remain many varieties which clearly represent the original species, these species have in many cases become so blended by hybridization, that frequently nothing short of an authentic history of a variety would suffice to assign it its correct specific position.

As the result of this blending and improvement, the resultant varieties have come to be planted indiscriminately throughout the region under consideration; reference being mainly had to their probable ability to mature their fruit within the season, and resort being had to protection in winter in regions in which very low temperatures are to be anticipated.

Vitis vulpina (rotundifolia), which includes the Scuppernong, also *candicans*, *cinerea*, *monticola*, *Novo Mexicana*, and *rupestris*, are Southern species, generally lacking hardiness at the North; few if any of them having produced varieties of value for Northern planting. The fact that Catawba and Isabella grapes, perfectly ripened in the open air at Excelsior, Minn., on the banks of Lake Minnetonka, were awarded a premium at the New Orleans Exposition, was a surprise to very many; since the former especially is not, with ordinary surroundings, considered sure to ripen fully north of latitude 39° or 40°.

That these varieties can be fully matured in the open air five or six degrees farther north, would indicate that the summers there are specially favorable for the purpose. A visit this year to the vineyard which supplied the specimens in question showed that it is favorably situated on dry, warm soil, sloping rapidly to the east and south, and that the cultivation and pruning were of the best and most effective kind, rendering the laying down and covering of the plants (which is indispensable here) easy and effective. Under only ordinary circumstances, however, many varieties were in an advanced stage of ripeness, and "Minnetonka grapes" were freely offered in the markets of Minneapolis and Saint Paul as early as the 18th of August.

That there is little difference between this region and those farther east so far as choice of varieties may be concerned, is clearly indicated by the following list, the relative popularity of each variety being indicated by the numbers attached to each, and the varieties being those recommended in the discussions of societies and the reports of committees:

Concord, 33; Moore, 27; Worden, 27; Delaware, 12; Pocklington, 12; Martha, 12; Janesville, 12; Agawam, 9; Lady, 9; Cottage, 8; Brighton, 7; Salem, 6; Telegraph, 6; Elvira, 6; Niagara, 5; Ives, 5; Dracut Amber, 5; Lady Washington, 5; Empire State, 4; Wilder, 3; Woodruff Red, 3; Coe, 2; Early Victor, 2; Perkins, 2; Vergennes, 2; Eumelan, 1; Barry, 1; Massasoit, 1; Lindley, 1; Champion, 1; Jessica, 1; Florence, 1; Hartford, 1; Crevelling, 1; New Haven, 1; Wyoming Red, 1; Northern Muscadine, 1; Clinton, 1; Marion, 1; Bacchus, 1; Black Hawk, 1; Black Eagle, 1; Beauty, 1; Red Fox, 1; El Dorado, 1; Jefferson, 1; Duchess, 1; Iona, 1; Rogers No. 33, 1.

The impolicy of the very common practice among the originators and introducers of new varieties of sending them out under numbers is strikingly manifest in the almost universal custom in the Northwest, in the discussions and reports of horticultural gatherings, to continue the use of the original numbers, sometimes coupled with the name, but quite frequently without such accompaniment, not only greatly to the inconvenience of the hearer or the reader of a report, but also with a greatly-increased liability to error consequent upon the use of figures.

It would, beyond doubt, inure greatly to the convenience of all concerned, if all societies could be induced, in cases in which names exist, to resolutely exclude the numbers from their discussions, and especially from the reports of their transactions.

THE PEAR.

The Pear of Europe and America (*Pyrus communis*) is indigenous in Europe and Asia. It had early been subjected to cultivation in Syria, Egypt, and Greece, and thence introduced into Italy during the early days of Rome. From this species comes the great mass of our modern varieties; although there are other species, among which are the Aurelian (*Pyrus salvifolia*), a native of France; the Snowy pear (*Pyrus nivalis*), a native of Australia, neither of which are represented among our cultivated varieties, and the Sand pear (*Pyrus sinensis*), a native of China and Cochin-China, from which, by hybridization with *P. communis*, the modern Le Conte, Kieffer, and others are *supposed* to have originated.*

Between March, 1879, and some time in 1884, Professor Budd, as the representative of the Iowa Agricultural College, made no less than twelve importations of pear trees or scions from different localities in Russia (including Poland) and Germany; also an importation from northwestern China.

The varieties included in these importations number sixty-three; although an uncertain number will probably prove to be duplicates. In publishing lists of the varieties thus introduced the professor remarks:

Our experiments with the pear mainly date from the time of our visit to east Europe, in 1882.

With some of the varieties of central and east Russia our progress has been slow, as the scions had not been packed properly for so long a journey. Yet we now have specimen plants of most of the varieties specially attracting our attention as likely to prove valuable for culinary or dessert uses, and we have sent out for trial many plants of the most promising sorts.

Our soil is not favorable for the pear; hence we used our first-planted trees in a rough way, by taking off all the new wood each year for scions. This treatment, combined with the severe weather of the last two winters, has given us correct notions as to the relative hardiness of varieties.

The following is a list of the varieties of pears imported by Professor Budd, with the names, as reported to the American Pomological So-

* It should be clearly understood that this is the merest conjecture, and that they are almost worthless in quality when grown north of about 38°.—H. E. VAN DEMAN.

ciety by Mr. Charles Gibb, of Abbotsford, province of Quebec, Canada, at the society's meeting at Boston, in September 1887. These names are arranged alphabetically, and accompanied by the Russian or German names, to insure ready identification. Until they shall have been printed and compared, there is of course a liability, as already stated, that some of them may prove to be duplicates :

Adopted name.	Russian name.	Adopted name.	Russian name.
Autumn Bergamot.	Bergamot Osennoi.	Lemon.	Limonnaya.
Baba.	Gruscha Baba.	Long Green (introduced long since).	Longue Verte.
Bauvier d'Automne.	Bauvier d'Automne.	Long Stem.	Dolgokvostka Morosovskaya.
Bear.	Dula Medvedevka.		Lutovka.
Czar.	Tsarskaya.		Ogonka.
Double Beurré.	Maslitchnaya Dvoynaya.		Pasovka.
Dula.	Dula.		Polish Lemon.
Early Duchess.	Duchesse Précoce.		Poltava.
Early Bergamot.	Bergamot Kannaya.		Pomerania.
Father's Keepsake.	Oicovska.		Pound (introduced long since).
Feigen.	Feigenbirne.		Princess.
Flat Bergamot.	Bergamot Ploskui.		Red Bergamot.
Gakovsk.	Gakovskaya.		Saccharine.
Goubalt (introduced long since).	Goubalt.		Salzburg.
Green Bergamot.	Bergamot Zelenui.		Sapieganka.
Green Wine.	Grüne Weinbirne.		Scented.
Grella.	Grella.		Seedless.
Grumkower.	Grumkower.		Strawberry.
Gute Grüne.	Gute Grüne.		Sugar.
Honey.	Gliva Medovaya (Honeybirne).		Victorina.
Juicy Gliva.	Gliva Otschen Sotch-naya.		Vinograd.
Junfer.	Junferbirne.		Vsduti Bergamot.
Korsun's Bergamot.	Korsun's Bergamot.		Waxen.
Kostotchka.	Kostotchka.		White Livland.
Krupyanka.	Krupyanka.		Winter.
Kursk.	Gliva Kurskaya.		
Kursk Bergamot.	Bergamot Kurski.		
Large Sugar.	Zuckerbirne, Grosse.		

At the annual meeting of the Iowa Horticultural Society in January, 1887, Hon. C. L. Watrous, reporting for the vicinity of Des Moines, Iowa, says:

Of pears there are not enough trees to count. Young trees of Seedless seem healthy and free from blight. Whether they will bear fruit, or what may be its quality, we know not, but live in hopes.

Andrew Peterson, of Carver County, southern Minnesota, during the summer of 1886, had several varieties of Russian pears and apples from his native country, Sweden; but, judging from appearances, he deemed those from Russia the most promising for Minnesota. In January, 1887, he reported the Russian pear trees as showing no injury up to that date; while of sixty varieties imported from Sweden one only is sufficiently hardy for Minnesota.

Professor Porter, of the Minnesota Agricultural College, reports a few Russian pears as on trial at that institution, near Minneapolis, where they give promise of much value.

The seedless pear (*Bessemianka*) is also reported to be on trial at Ramsey, McCook County, Dakota.

A few pear trees grown from seeds brought from Russia by the Mennonites, are said to be growing in southwestern Minnesota.

Professor Budd, in January, 1887, said :

I believed six years ago, and am stronger in the belief now, that east Europe has many sorts of pear, cherry, and plum which would give perfect satisfaction in the north half of Iowa, and some in Minnesota and the north half of Dakota.

It is feared by many that the transplanting of Russian fruits to the much lower latitude of Iowa may greatly affect their season of maturity, and that it may even injuriously affect their quality and, by possibility, their hardiness ; but the season of ripening may be deemed less important with this fruit than with the apple. These influences will therefore be more fully considered in connection with that fruit.

In advance of a thorough trial, Professor Budd expresses the conviction that a very considerable number of the varieties mentioned in the foregoing list will prove hardy as far north as central Iowa, while a few of them, among which he names Seedless, Gakovsk, and others are considered to be adapted to a wider, though yet indefinite, range northward. Careful and extended experiment, such as he is understood to have already in progress, can only surely determine the correctness of these suppositions. Meantime he suggests a resort to the artificial crossing of the best and hardiest of the older and well-known varieties upon the most promising of these foreigners, with the hope of improvement possibly in both quality and hardiness.

Speaking with reference to southwestern Iowa, he remarks :

With regard to Chinese pears, those who have condemned them get their trees from New Jersey or about Philadelphia. From such experience we are all inclined to condemn Chinese pears. On the college grounds they came through all right. I do not mean the Sand pear, but the Snow pear. Some of them I can recommend for this part of the State.

We have Snow pear trees from northwest of Pekin. Eugene Simons sent fifteen varieties of Snow pears from China to Metz, France. I was there when these were bearing and the pears ripe. Some of them are hardy enough for this part of Iowa ; and I do not know how much farther north they will endure the climate.

The professor, on another occasion, says :

“ Our pear, coming from southern Europe, is subject to blight here, but not there ; which shows that they are not adapted to our country. We can start from seedlings and work up our pears. But even this is not necessary. We have a sadly-misused pear tree on the college farm, that made during the past year, from 3 to 5 feet of growth, which is entirely hardy and an abundant bearer. This pear has stood everywhere, without any blight, in northern Dakota, near the Rocky Mountains and all over the Northwest. We also have other pears which are hardy and fruitful.

In the *Prairie Farmer* of September 17, 1887, the professor says :

On general principles, I can say that Bezi de la Motte, St. Ghislain, and Flemish Beauty will be likely to do as well as any of the old sorts. Of the newer pears from Russia, the Seedless and Gakovsk are as promising as any for home use or market.

It is understood that the last two varieties have not yet fruited in this country. If so, it must be inferred that the foregoing conclusion, involving their productiveness and the quality of the fruit, as well as

the vigor and hardiness of the trees, is based mainly upon his knowledge of their performances in their original locality. Except upon a statement of the reasons for such conclusion, in such case it must be assumed to be rather suppositional than conclusive.

A society report from southwestern Iowa, made in 1886, says the pear crop there is a failure, most of the trees being nearly dead.

Mr. Denlinger, of Dubuque County, is reported as having on trial the Arctic pear, a Russian variety, which in 1885 made a growth of 3 feet. He also had the Keiffer on trial.

In 1886 the Dubuque Society recommended the Longworth pear (a variety very little known) as worthy of trial, also the Seedless and Gakovsk, two of Professor Budd's importations from Russia.

Circumstances would indicate that these recommendations were probably made rather on account of the apparent hardiness of the trees than from a definite knowledge of the quality of the fruit as produced in this country.

An additional indication of the uncertainty of the more common varieties of this fruit even in eastern Iowa occurs in a paper by John Evens, read before the Union Horticultural Society in 1886, as follows:

I have planted many pear trees, mostly standards, but have not fruited very many. Could get them to grow well for a few years, or until they were old enough to bear, and then the blight would take them. I have had the best success with Bartlett, Flemish Beauty, Sheldon, Tyson, Buffum, Seckel, White Doyenne, Angouleme, and Lawrence.

Secretary Hammond, of the Illinois State Horticultural Society, names Flemish Beauty, Anjou, and Tyson as having proved hardy in the northern portion of that State.

Dr. T. H. Hoskins, of northern Vermont, in the American Garden for September, 1887, says of the new Russian pears:

Whatever may be the individual or class merit of these pears as dessert fruit (and we are not likely to find many, if any, equal to the best of our old varieties among them), they are yet remarkably interesting as a class, not only for their superior hardiness against cold and drought, but also from the fact that they introduce a distinctly new strain of blood, so to speak, and one which, by crossing upon those we already have, is likely to give us some superior varieties. The firm glossy foliage, not so thick and firm as that of the Chinese, but yet tending that way, indicates a strong resistant power, not only against heat and dryness, but also against insects and fungi. In the many years I have been trying in vain to discover one pear which I could grow successfully in northeastern Vermont, one of the most discouraging things I have noted about all of them (except Keiffer and Le Conte) has been the defective character of the leafage. Indeed I think that if it were not for this insurmountable difficulty we already have pears hardy enough to grow much farther north than they are with success. Without healthy leaves there can not be thoroughly matured wood; and it is the weakness consequent upon this which I think has prevented my success with such "almost hardy" pears as Onondaga, Clapp's Favorite, Jackson, Flemish Beauty, and Grand Isle. They endure, as it is, all but our severest winters, and therefore it seems to me that if we could give them a better leaf we could grow them successfully. Now it happens that some of the Russian pears reported to be best in quality are also the hardiest and have the best foliage. A cross of Seedless, Sapieganka, Dula, Tonkovieta, or Pasovka upon our hardiest sorts named above might confer

upon the seedlings that better leaf which is so greatly needed. I trust that some enthusiastic pear-growers may be sufficiently interested in the matter to be willing to make these crosses and grow the resulting seedlings to fruitage. This can only be done by those so situated as to be able to grow and fruit both kinds, which we of the "cold North" are unable to do.

This last conclusion is but partially true, since even at the "cold North" these new iron-clads may be grown to fruitage and the bloom fertilized with pollen from milder climes.*

How far north the pear may be successfully grown in America is a problem the solution of which can only be fully accomplished in the remote future. Although there is a popular notion that a plant may be gradually brought to endure a climate more exacting than that to which it was originally adapted, experience has long since shown that the capacity for such variation, so far as varieties are concerned, lies within very narrow limits. The process through which important results of this character are to be accomplished must rather be the more tardy one of reproduction and selection, either artificial or natural, through which all the wide adaptations of both animal and vegetable life have been wrought.

By the light of science, aided by intelligent manipulation, the otherwise tardy process of natural selection—the survival of the fittest—may, beyond a question, be greatly hastened. Doubtless, mainly through natural processes, these Russian fruits have been brought to an adaptation to that climate not originally inherent in the species; and their introduction to the trying climate of our central prairie region thus affords to us a vantage-ground—an advanced starting-point—from which results desirable to us may perchance be sooner reached, since it may be fairly assumed that their surroundings here of climate and soil can not be completely identical with those whence they were taken; and, if so, that new characteristics, only to be acquired through reproduction and selection, are likely to be found needful for their proper adaptation to the new surroundings.

Viewed even in this light, the labors of Messrs. Budd and Gibb must be deemed to be of great value to the pomology of the North, since even should these introductions fail to realize the sanguine hopes of the introducers, they will surely afford the foundation, otherwise wanting, upon which the more certainly and rapidly to build a satisfactory superstructure in a nearer future.

THE APPLE.

The Apple of Europe and America (*Pyrus malus*) was introduced in North America from Europe by the early settlers. It is believed to have sprung from the wild crab of Europe, and was extensively culti-

* The writer by this evidently means to refer to the fact that pollen may be sent by mail or otherwise from regions of a milder climate, where the better, but tenderer, pears will succeed. It may not be generally known that pollen of many kinds may be kept for months and even years and retain its vital powers.—H. E. VAN DEMAN.

vated by the Romans, who are supposed to have introduced it into England; whence it was brought to this country. The Siberian crab (*Pyrus baccata*), in various improved forms, is more or less common in this country, especially in regions in which superior hardness is requisite. A kindred species, known botanically as *Pyrus prunifolia*, is also a native of Siberia. China also has an allied species, known as *Pyrus spectabilis*.

Our wild and uneatable native crab (*Pyrus coronaria*) is common in the northern United States, and a species known as *Pyrus rivularis* occurs west of the Rocky Mountains. The dwarf, or Paradise apple, used mainly as a stock for dwarfing the apple, is considered to be a variety of the common apple.

(1) In treating the subject with more especial reference to the apple it appears more convenient to consider the region in question as divided into districts. In so doing it seems proper to commence at the east, designating northern New York, Vermont, New Hampshire, and Maine as the Northeastern District.

While the Champlain Valley is found to be more congenial to fruit culture than most other regions in that latitude and vicinity, the favored location is of but limited extent. Throughout northern New York, Vermont, and New Hampshire generally the climate is quite too severe for the great mass of popular apples. Fameuse here being one of the most satisfactory of such, although even this is by no means exempt from occasional injury in winter, while its tendency to scab and crack is a serious drawback upon its usefulness. There is in this northern region an apparent improvement in the texture and glossiness of its foliage, which may be supposed to the more perfectly adapt it to a dry climate, as well as to increase its ability to fully mature its wood in preparation for the occasionally-exceptional severity of winter. Even with such preparation, however, it occasionally fails to withstand the trials of a crucial winter, and for these reasons there is here as elsewhere an anxious casting about for a hoped-for substitute.

Several recent varieties have been tested by Dr. T. H. Hoskins, of Newport, Vermont, and others, among which Scott's Winter, at present, is thought to be the most promising, at least for the region in question.

The importations by the Agricultural Department at Washington, and the more recent ones by the Agricultural College of Iowa, have been watched with great interest here, and many of the varieties have been or are being tested. Mr. Charles Gibb, of Abbotsford, Quebec, was the associate of Professor Budd in his expedition to central and eastern Europe for the purpose of studying varieties and climates, and it is understood that he has since made a second visit to that region upon the same business.

For the purpose of, as far as practicable, adapting the, to us, unpronounceable pomological nomenclature of Russia to the needs of English-speaking people, the American Pomological Society, at its meeting

at Grand Rapids, Michigan, in 1885, constituted Mr. Gibb a committee of one to revise and, when needful, to Anglicize the names of these introduced varieties; an onerous and perplexing task, which he has now completed; his final report having been made at the recent meeting of that society at Boston.

The pomology of the sea-board portion of the State of Maine is so affected by oceanic influences that it does not differ very widely from that of southern New England. The more northern interior is yet a new and comparatively unimproved region, in which fruit culture is yet in a comparatively crude state. It is understood, upon the authority of Dr. Hoskins, that there exists there an extensive tract of lake country well adapted to the cultivation of the apple—it being moderately elevated, with convenient access by river navigation to the sea-board. Its pomology, when developed, may be expected to assimilate somewhat closely with that of the adjacent inland province of Quebec, which does not differ very widely from that of the extreme northern portions of western New England.

(2) The district of the Great Lakes includes central and western New York, and thence westward to and including the lower peninsula of Michigan.

So varied are the local influences of the Great Lakes westward of eastern New York and thence to Wisconsin and Minnesota, modified as such influences are by the direction of prevailing winds, that a climatic division of this region upon parallels of latitude become impracticable.

In central and western New York, and equally in the lower peninsula of Michigan, these influences are so far equivalent to the oceanic influences which modify the climate of southern and eastern New England, that their pomology is practically identical, and may therefore be considered as mainly without the scope of the subject under consideration.

(3) The Wisconsin lake district includes a comparatively limited region in Wisconsin, lying along the western shore of Lake Michigan, which derives a very perceptible climatic advantage from such proximity, which would doubtless be fully the equivalent of that realized upon the eastern shore, but for the fact that the prevailing winds of that region are westerly, bringing an increased tendency to drought and to paroxysms of cold in winter which reach the region without the mellowing influences of the open waters of Lake Michigan; thus creating a climate intermediate between that of the Upper Mississippi Valley and that of the lake region proper.

(4) The Lake Superior district, including the upper peninsula of Michigan, together with a strip of northern Wisconsin along the south shore of Lake Superior. Although extending northward beyond the parallel of 47° , this district is yet so favorably affected in climate by the surrounding lakes, that it escapes some of the severity of the climate of regions upon that parallel farther west.

Although fruit culture has so far received but slight attention there, the experience already had indicates, as may have been inferred from its lacustrine surroundings and the direction of prevailing winds, especially in winter, that the climate becomes less desirable for such purpose as we proceed westward until we pass beyond the lake influence, and come within the typical climate of the western plains.

C. D. Lawton, of Lawton, Mich., who has spent much time in the upper peninsula of Michigan, states that fair apples are grown there, and that there are many fine trees which sometimes bear well. There is abundance of plums, when frosts do not catch the bloom in spring. They are mostly wild red plums, although the cultivated varieties seem equally successful where tried.

Pears do pretty well also; at least he has seen trees loaded with excellent fruit, which matured nicely.

He never elsewhere saw Early Richmond cherry trees more heavily loaded with fruit than there, wherever they have been planted. The branches needed to be propped up to prevent breaking under the loads of fruit. Currants, gooseberries, raspberries, blackberries, and strawberries abound.

Although this is a cold country, it has much good soil well adapted to root crops, as well as to many of the hardy fruits, which will doubtless be successfully grown as soon as agriculture shall become a staple industry.

At the Chippewa County fair in 1880 a fine display of apples was made, grown from trees of hardy varieties obtained from a Minnesota nursery.

In Delta County the last State census reports a ten-acre orchard of bearing peach trees.

Marinette, the half-breed granddaughter of an Indian chief, is said to have planted the first apple orchard in Menominee County, which is still in bearing.

C. D. Lawton has seen, at L'Anse, Baraga County, fine apples of Fameuse, and some of Russian and other hardy varieties, as well as an abundance of other hardy fruits.

Trees from the head of Lake Superior, including Oldenburg, Wealthy, Siberian crab, and others were planted in this county in 1862, which are yet doing well and producing fair crops of fruit.

Mr. Lawton also reports hardy apples and other fruits successful in Ontonagon County.

The State census of 1884 reports 94 acres of apple-orcharding in the upper peninsula.

Owing doubtless to the influence of the surrounding waters the orchards of the peninsula are exempt from blight, or at least so nearly so that the malady attracts no attention.

(5) Since westward of the districts heretofore described there are few if any local influences which essentially modify the climate, the south-

ern prairie district will consist of northern Illinois, the south two-thirds of Iowa, all of Nebraska, and the south half of Wyoming.

(6) The intermediate prairie district will include the south half of Wisconsin (westward of the lake district), the north one-third of Iowa, the south one-third of Minnesota and Dakota, with the north half of Wyoming.

(7) The northern prairie district includes northern Wisconsin (omitting the Lake Superior region), the north two-thirds of Minnesota and Dakota, and all of Montana.

BLIGHT AND LACK OF ABILITY TO WITHSTAND THE HOT DRY AIR OF THE SUMMERS OF THE WEST AND NORTH.

In the earlier days of apple culture in the northern United States what is now known as blight seems to have been unknown, or if known, to have been confined to the pear. Even at the present day apple-tree blight, where known at all from Michigan eastward, has not proved specially troublesome. Only farther west, under greater extremes of heat, cold, and aridity, has the malady proved serious and even fatal.

A singular, and to some at least an unexpected, circumstance is, that it becomes even more virulent and fatal as we go northward. Practically unknown in Europe, it in many cases proves fatal to varieties introduced from that country in our interior American climate.

Apparently akin to the blight so often fatal to the pear, like that insidious malady, it has so far eluded the discovery of either the cause or cure; although the comparative exemption of the East and the lake region of the West, including the cold but moist region of upper Michigan, together with the observed fact its outward manifestation usually occurs during the heat of the day, strongly indicate that both heat and aridity may be essential to its effective existence. It may also be reasonably inferred that a lack of hardiness in winter may not infrequently be due to the lack of maturity consequent upon loss of foliage from blight in summer.

HARDINESS IN WINTER.

Just what peculiarities of composition and structure go to constitute the quality of wood-growth, known as hardiness, seems yet to be an unsolved problem. It is nevertheless quite well understood that in the case of the apple-tree, now under consideration, it becomes necessary that the season's growth shall have been thoroughly perfected; that the maturing processes shall have been completed, and that the whole be done well in advance of winter; in other words, that a hardy tree must be one whose growth is quite sure to be thoroughly ripened well within the proper season.

Aiming to secure results of this character for his State, as well as for the North generally, Peter M. Gideon, of Excelsior, Minn., some twenty-three years since commenced the process of reproduction and

selection, using the Siberian crab as the basis of his operations. The following is extracted from his report to the Minnesota State Horticultural Society in January, 1887, as superintendent of the State Experimental Fruit Farm, which, although perhaps over-enthusiastic, yet gives a correct idea of the processes employed:

It is with pleasure that I comply with your request to give my views on Russian and seedling apples. The seedling has been my hobby for the last sixteen years, and the success attained gives me hope that not far in the future the cold Northwest will be one of the leading apple growing districts of North America.

Twenty-three years ago I planted a few cherry-crab seeds, obtained of Albert Emerson, Bangor, Me., and from those seeds I grew the Wealthy apple; in seven years it fruited, and that fruit convinced me that the true road to success was in crossing the Siberian crab with the common apple, and on that line I have operated ever since, with results surpassing my most sanguine expectations. I did not suppose that in the short space of sixteen years, the time since the Wealthy first fruited, that I should have more than twenty first-class apples, as good as the world can produce, in succession from the 1st of August to March, and in hardiness of tree surpassing all known varieties of the common large apple. But it is done, and in the doing, the problem is solved as to what to do and how to do it, with the material at hand with which to attain yet greater results. At the outset it was test and try; but now that the problem is solved, it is onward, with great results certain.

When I say we have twenty first-class apples, that does not include all that are worthy of cultivation by any means. And now, with such results and only a few thousand trees fruited at the end of sixteen years, what may we not expect at the end of the next sixteen years with 20,000 or 30,000 choice selected trees from the very best of seed which are not yet fruited, and the seed of over 100 bushels of choice apples planted this fall, all to fruit in a few years. Then on planting the seed of the best each year, soon the choice varieties will count into the hundreds, and the great Northwest will be the fruit paradise of America.

To get the desired cross we plant the selected varieties in close proximity, so that the natural flow of pollen will the more surely do the desired fertilizing, and the seed thus produced is planted, the most promising of the seedlings selected and set in orchards for fruiting, and after fruiting the best in tree and fruit is selected from which to grow seeds to try again, and so on; at each repetition I find there is a gain. The young trees that fruited this year for the first gave a larger percentage of first-class than any lot ever fruited before.

By crossing and judicious selection we retain the hardiness of the crab in the tree without the crab thorus, and on top grow large apples without the astringency of the parent crab. And yet by the commingling of the two natures we get an exquisite flavor not found in any other class of apples, especially so when made into sauce. But our triumph is not yet completed. We must—we can, fill up the balance of the year with a continued succession of luscious apples. There is no question as to the certainty of such a result. The past is a guaranty that it can be done.

But the proper cross can not be got in Minnesota—a fact clearly demonstrated in the extensive and expensive trials that have been made in the last nine years in the State orchard. And here let me state that the seedling is inclined to ripen its fruit at or near the time the parent apple did from which the seed was taken; hence the need of seed from long keepers to grow the same. There are no long keepers of the best quality yet found that are hardy enough to fruit in Minnesota; but we can take our best hardy seedling farther South, where the long keepers can be grown and there get the cross, and then bring our seed here to grow, and test the hardiness of the tree and the quality of fruit. We want first-class apples, and to get them we must use first-class parentage, and even then scullions will be numerous, from the fact that all varieties of apples are mongrels of many degrees of crossing, and the various relations

will crop out in a multitude of forms. But past success is a guaranty for the future, that out of the many some will be good. Our seedlings will average in quality with Hyslop and Transcendent; but those of first-class, such as we propagate, stand about one to five hundred, as hardy as Duchess and Wealthy, and of the extreme hardiest about one to fifteen hundred.

Seedling trees for distribution.—Two years ago this winter was the first time the Duchess and Wealthy were seriously hurt, and a like fate befell all the Russians on our grounds, so that not a Russian set an apple on our grounds the next year, whilst alongside of them our seedlings carried a fair crop, some of them profuse, and this year all bore heavy crops; showing beyond a question that the crab infusion is to be the foundation of successful fruit culture in the Northwest. The State orchard yielded about 100 bushels of apples this year, all of which being off our own seedlings; all else of value failed two years ago this winter. This fall we planted the seed of over 100 bushels of choice apples, to grow for experimental purposes. We now have thousands of choice trees on hand for distribution to those who want one, two, three, and four year old trees from seed.

Among the numerous varieties thus originated by Mr. Gideon he names Lou, August, Florence, Cherry-Red, Excelsior, September, Martha, October, Wealthy, Gideon, Peter, and January as especially desirable, and as supplying a succession from the 1st of August to March.

Feeling the importance of being able at the earliest possible moment to supply an ample assortment of varieties adapted to the climate, not only are prominent fruit-growers watching carefully such local seedlings as come to their knowledge, but horticultural societies also are aiding the work by the appointing of committees and in various other ways.

Such recent varieties appear in the following tabulated list, accompanied in the proper column by a dagger (†) indicating that they have been reported worthy of trial in the district to which such column is devoted.

Aside from the foregoing, the tabulation comprises only the older varieties of American origin found to be more or less successful in some portion of the region under consideration. In the second district, however, where even the more tender varieties prove successful, note is only made of varieties which, while successful in other and more trying regions, are at the same time popular here, and is marked by an asterisk (*). This sign in every case signifies that the variety so marked is reported as successful in the district indicated.

Throughout the tabulation an interrogation accompanying an asterisk (*?) is intended to indicate that while the variety is more or less desirable in the district, either from blight in summer or from deficient hardiness in winter, it is liable to more or less serious objection.

Varieties.	Northeastern district: northern New York and northern New England.	District of Great Lakes: central and western New York, northern Ohio, and lower Michigan.	Wisconsin lake district: west shore of Lake Michigan.	Lake Superior district: upper Michigan and a portion of northern Wisconsin.	Southern prairie district: northern Illinois, southern two-thirds of Iowa, Nebraska, southern half of Wyoming.	Intermediate prairie district: southern half Wisconsin (west of lake district), northern third of Iowa, southern third of Minnesota and Dakota, northern half of Wyoming.	Northern prairie district: northern Wisconsin (omitting Lake Superior region), northern two-thirds Minnesota and Dakota, all Montana.
American Golden Russett					(*)		
American Summer			(*)		(*)		
August						(h)	(h)
Beech's Sweet						(*)	
Ben Davis	(*)	(*)	(*)		(*)		(*)
Benoni	(*)	(*)			(*)		
Bethel (Vermont)							
Black Annette	(*)				(*)		
Boone						(*)	
Brett No. 1						(h)	
Brett No. 2						(h)	
Brett No. 3						(h)	
Briar's Sweet						(h)	
Buckingham					(*)		
Canada Baldwin	(*)						
Cherry-Red						(h)	(h)
Cole's Quince		(*)	(*)	(*)	(*)	(h)	
Dart							
Dominie		(*)	(*)		(*)	(h)	
Duchess Seedling							
Dyer		(*)		(*)	(*)		
Early Harvest		(*)		(*)	(*)		
Early Pennock					(*)		
Early Strawberry Crab				(*)		(*)	(*)
Elgin						(*)	
Fall Orange		(*)			(*)		
Fall Queen (Haas)	(*)	(*)	(*)	(*)	(*)	(*)	
Fameuse	(*)	(*)	(*)	(*)	(*)	(*)	
Fameuse Sucri	(*)						
Flat Apple					(h)		
Florence						(*)	(*)
Flory							
Gibb	(*)		(*)	(*)	(*)		
Gideon						(*)	(*)
Gilpin (Little Romanite)		(*)					
Golden Russett (New York)	(*)	(*)	(*)	(*)	(*)		
Golden Sweet		(*)			(*)		
Gravenstein		(*)				(*)	
Grimes' Golden		(*)	(*)		(*)		
Hall's Greening						(h)	
Hotchkiss						(h)	
Hawthornden		(*)	(*)	(*)	(*)	(*)	
Hightop Sweet (Sweet June)		(*)			(*)		
Hyslop	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Iowa Russett	(*)					(*)	(*)
Jeffries		(*)			(*)		
Jonathan		(*)	(*)	(*)	(*)		
Kaump					(h)	(h)	
Klein						(h)	
Late Strawberry		(*)	(*)		(*)		
Lou						(*)	
Lowell		(*)	(*)		(*)		(*)
MacIntosh Red							
McMahon's White	(*)				(*)	(*)	
Maiden's Blush		(*)	(*)		(*)		
Maiden's Blush Crab						(*)	
Mann		(*)			(*)		
Martha					(*)	(*)	
Milam					(*)	(*)	
Minnesota					(*)	(*)	(*)
Newport					(*)		
Northern Spy					(*)		
Northwestern Greening						(*)	
October						(*)	(*)
Okobena						(h)	
Orange Crab							(*)
Orange Winter						(h)	

Varieties.	Northeastern district: northern New York and northern New England.	District of Great Lakes: central and western New York, northern Ohio, and lower Michigan.	Wisconsin lake district: west shore of Lake Michigan.	Lake Superior district: upper Michigan and a portion of northern Wisconsin.	Southern prairie district: northern Illinois, southern two-thirds of Iowa, Nebraska, southern half of Wyoming.	Intermediate prairie district: southern half Wisconsin (west of lake district), northern third of Iowa, southern third of Minnesota and Dakota, northern half of Wyoming.	Northern prairie district: northern Wisconsin (omitting Lake Superior region), northern two-thirds Minnesota and Dakota, all Montana.
Peach (Montreal)	(*)						
Peerless						(*)	
Perry Russett		(*)	(*)			(*)	
Pewaukee	(*)	(*)					
Plum's Cider							
Porter			(*)				
Pound Royal		(*)					
Powers' Crab						(*)	(*)
Primate					(*)		
Quaker Beauty							(*)
Quince of Coxé					(*)		
Ramsdell's Sweet					(*)		
Rawle's Janet					(*)		
Red Canada					(*)		
Rollins							
Roman Stem					(*)	(*)	
Rome Beauty		(*)			(*)		
St. Lawrence	(*)	(*)		(*)	(*)		
Salome					(*)		
Sarnia Crab						(*)	
Saxton (Fall Stripe)					(*)		
Scott's Winter	(*)					(*)	(*)
Seever					(*)		(*)
September					(*)	(*)	
Sheriff					(*)		(*)
Soiree						(*)	
Sops of Wine		(*)			(*)		
Shiawassee	(*)	(*)					
Summer Hagloe		(*)			(*)		
Sweet Russett						(*)	
Talman Sweet		(*)	(*)		(*)	(*)	
Telfer Sweet Crab						(*)	
Transcendent		(*)		(*)		(*)	(*)
Utter's Red						(*)	
Virginia Crab						(*)	(*)
Wabasha					(*)		
Walbridge	(*)				(*)		
Wealthy	(*)		(*)	(*)	(*)		(*)
Wealthy Seedling						(*)	
Westfield Seek-no-Further		(*)	(*)		(*)		
Whitney's No. 20	(*)	(*)	(*)		(*)	(*)	(*)
Williams' Favorite		(*)	(*)		(*)		
Willow		(*)	(*)		(*)		
Winesap							
Winstead						(*)	
Winter St. Lawrence	(*)						
Wolf River			(*)				
Yellow Bellflower					(*)		
Yellow Ingestrie					(*)		

An examination of the foregoing table will develop the fact, that even the limited success of eastern varieties of the apple, when grown westward of the Great Lakes, is mainly confined to the southern portion of the region under consideration; and it may be further stated that a more critical examination, aside from the table, will determine that even this measure of success is to be attributed to the more favorable conditions occurring in southern Nebraska and in the extreme southern part of Iowa.

Another noticeable circumstance is, that as we progress northward, planters are compelled to rely more and more upon varieties partially or wholly of Siberian-crab parentage, until, in the more northern portions of Wisconsin and Minnesota, and doubtless even more so in northern Dakota and Montana, the successful varieties are almost wholly of this species.

At the annual meeting of the Minnesota State Horticultural Society, in January, 1887, a black-list, consisting of semi-hardy varieties "that it may be considered especially dangerous to recommend for planting in large quantities," was adopted, as follows: Mann, Bethel, Walbridge, Fall Queen (Haas), Pewaukee, Alexander, Borsdorf, Northern Spy, Salome, Utter's Red, Fameuse, Wolf River.

At present many are probably looking earnestly to the newly-imported Russian apples to supply the deficiency; *but whatever shall be the measure of their success, actual trial alone can demonstrate their ability to meet and supply so extreme a want.*

The Iowa Agricultural College, from the outset, seems to have made an earnest effort for the development of the horticulture, and especially the pomology of the State. An early step in this direction was the planting of an extensive orchard, comprising the varieties at the time considered hardy in the State. The increased severity of subsequent winters began to tell upon it, and when it began to show serious signs of failure, another plantation was made of iron-clads, to be top-grafted with such varieties as were reputed to be specially hardy. Among these were a considerable number of local seedlings, which had acquired special reputation for hardiness. These were interspersed with some selected Russian varieties, thus affording a comparative trial of the two. In the summer and fall of 1887 many of these last were bearing fine crops, while, as stated by Professor Budd, the recent exceptional winters had almost wholly swept away the supposed hardy natives interspersed among them, while the remains of the older orchard were being dug out and burned.

Doubtless, under the influence of discouragements akin to those already described, Mr. A. G. Tuttle, of Baraboo, Wis., imported scions of Russian apples probably as early as 1866 or 1867, which he proceeded to propagate, test, and disseminate. To these he subsequently added varieties from other and later importations, so that he now has a very considerable orchard exclusively of Russian varieties in full bearing.

A visit to this orchard in August last found several of the earliest varieties already past season, while others were ripe or rapidly approaching maturity, affording apparent ground for the claim that, owing to change of latitude, or other cause, there is among them a deficiency of long keepers. However this may be, the trees which had withstood the trials of the recent severe winters were almost universally sound and healthy, excepting that a very considerable number of them gave evidence of the effect of blight upon the younger branches during the past summer.

The healthy condition of this orchard (and the same is true of at least another in the vicinity) was in strong contrast with that of other trees upon the same premises, except of such of our native varieties as have usually been considered very hardy, such as Fameuse, Willow, Ben Davis, Grimes's Golden, and others, many of which showed serious, if not even fatal, injury, doubtless the effect of the trying winters already referred to.

The U. S. Department of Agriculture also, in 1870, made an importation of scions from Russia, of which a list of numbered varieties is published, and the scions widely distributed for trial. The Russian names were so difficult of pronunciation, that even yet they are very commonly referred to by numbers.

An early test of a very considerable number of these, including perhaps some of their own importations, was made by Ellwanger & Barry, of Rochester, N. Y., by the planting and fruiting them in their trial grounds.

An examination of these in fruit, in company with W. C. Barry, early in September, 1883, showed nearly all these even then, fully ripe or already overripe; and the quality, without exception, proved to be so low, that the general conviction was that their chief value must be supposed to consist in their ability to transmit their probable hardiness to a progeny of new originations of higher quality.

In 1878 or 1879 the authorities of the Iowa State Agricultural College deputed Prof. J. L. Budd to arrange for the importation of trees, plants, and scions from localities in central and eastern Europe in which, from similarity of soil, climate, etc., he might hope to obtain varieties adapted to the conditions occurring in Iowa and other portions of the Northwest.

In pursuance of this purpose, the professor, in company with Mr. Charles Gibb, of Abbotsford, Quebec, made a lengthened visit to central and eastern Europe, extending their trip as far as the valley of the Upper Volga, where, in most essential particulars, the climate is nearly akin to that of the valleys of the Upper Mississippi and Missouri. As the result of such visit and examinations, besides other fruits, shrubbery, forest, and ornamental trees, no less than nineteen importations of apples were made between May, 1879, and January, 1885, from various localities in Russia, Poland, Germany, and Austria.

These, together with those secured from the importations of others, have been extensively propagated at the college, and the product widely disseminated at a nominal charge for trial throughout the Northwest, so far as their success seemed probable, but under an arrangement providing for careful reports of results.

Complaint is made by President C. G. Patten, of the Iowa State Horticultural Society, and by others as well, that some of the Russian apples are slow growers—a peculiarity which may with some of them prove to be constitutional, having, as they had, their origin at the extreme north, where, doubtless owing to the shortness of the growing

season, together with the unusually arid climate, the tree under continued propagation from seed assumed a permanently dwarfish condition, not likely to become changed by the transmission of the variety to a different climate—a fact likely to prove equally true so far as hardiness also is concerned; although it must be conceded that in this particular there may be at least apparent exceptions, since at Des Moines, on the grounds of Hon. C. L. Watrous, were found a considerable number of what are considered to be among the hardiest and most desirable of the Russian apples; trees of which, four or five years planted, when cut through, were found to be more or less black-hearted, and many of them quite past the possibility of successful growth and permanent usefulness. Similar cases of obvious winter-killing in the case of older bearing trees of Russian apples were also seen upon the grounds of A. W. Sias, of Rochester, Minn., as well as in another extensive orchard in that vicinity, and also upon the grounds of President Patten.

A change of latitude, accompanied, as it must necessarily be, by a change of climate, and especially in going southward, by lengthening of the growing season, must necessarily change the season of ripening, at least in the case of a winter fruit. This is a well known result of such migration of our native fruits, which must prove equally true of these importations, although the extent of such variation can only be surmised in advance of actual trial.

There is also in America, and doubtless likewise in Europe, an unmistakable modification of the character of fruits, doubtless due to modified climate, when transferred inland, even without change of latitude; but just how much of such change may be due to greater aridity, higher or lower average temperature, more violent extremes, deficient moisture in the soil, or to variations of soils, is a problem too complex for satisfactory solution—under these varying circumstances; while a change in the season of maturity and possibly the variation of the quality of fruit may be anticipated, and the probable direction of such variation foreseen, its amount, whether in season or quality, can only be determined by actual trial.

While, therefore, there are in many minds grave doubts as to the soundness of the opinions put forth by Professor Budd and others respecting the sufficiency of the Russian apples to meet and supply the present lack, such doubts seem mainly to turn upon the question *whether, under so extended a transplacing, they are likely to sufficiently retain their original long-keeping qualities.* In this connection it is perhaps due to the professor to state that, while he does not deny the objectionable modification of the earlier importations of Russian apples as to the season of ripening, he urges that these were west Russian or sea-board varieties; and that the varieties from the interior, where the climate is more nearly that of the prairie regions, have been but recently imported, and that they yet lack time to show results. He insists that among these there is good reason to anticipate a sufficient supply of long keepers.

Since these experiments are being conducted at the South (latitude 42°), the object of pre-maturity may be expected to become less and less as we go northward, where the chief question becomes that of sufficient hardiness.

The blight of the apple-tree, if not wholly unknown in New England and New York, is at least so little known as scarcely to excite remark; while in Michigan it rarely attacks a tree below the growth of the current year, and not even that to such extent as to effect serious injury. As we go westward the malady becomes increasingly troublesome beyond Lake Michigan, increasing in virulence westward, and especially northward. At 20 miles from the lake, in Wisconsin, it occasions more or less injury; while at Baraboo, midway across the State, it becomes increasingly troublesome, occasional trees being nearly or quite ruined by it. In northern Iowa and southern Minnesota it is quite as prevalent and injurious. Still farther north, at Excelsior, Peter M. Gideon finds it very troublesome upon crab seedlings, while his orchard of Russian apples has been utterly ruined by it.

From all the circumstances, it seems highly probable that there may at least be a climatic predisposing cause. If so, there would probably be between the apparently similar climates of central North America and eastern Europe some occult difference which has so far eluded observation, since this malady, so prevalent and destructive in the former, is said to be practically unknown in the latter.

The number of varieties included in these several importations of apples can not be less 350. If, among these, a dozen, or even a half dozen, satisfactory long keepers shall occur, in addition to the earlier ones already tested, the undertaking will doubtless be felt to be amply justified, to say nothing of the means acquired for the origination of a better, because hardier, race of fruit in the future.

In tabulating the following varieties of apples of Russian or east European origin, the names as reported by Charles Gibb, of Abbotsford, Quebec, to the American Pomological Society, are arranged alphabetically, and their success, so far as known, noted by districts, as in the table of native varieties.

The European name is appended in each case, to facilitate reference and insure identity.

In the report of Mr. Gibb there seems to have been cases of uncertainty, which he indicates by an interrogation (?). These are introduced into the following tables along with the names.

In the alphabetical arrangement of the adopted American names, in some cases the same name appears apparently applied to more than one fruit; also in one or more cases the name adopted had been previously applied to an American fruit. In such cases attention is also called to the fact by an interrogation (?).

Although not included in Mr. Gibb's report, Alexander, Oldenburg, and Tetofski, being Russian apples, are introduced into the following list:

Varieties.		Northeastern district: northern New York and northern New England.	District of Great Lakes: central and western New York, northern Ohio, and lower Michi- gan.	Wisconsin lake district: western shore of Lake Michigan.	Lake Superior district: upper Michigan and a portion of northern Wis- consin.	Southern prairie district: northern Illinois, south- ern two-thirds of Iowa, Nebraska, southern half of Wyoming.	Intermediate prairie dis- trict: southern half of Wisconsin (west of lake district), northern third of Iowa, southern third of Minnesota and Da- kota, northern half of Wyoming.	Northern prairie district: northern Wisconsin (omitting Lake Superior region), northern two- thirds of Minnesota and Dakota, all of Montana.
Adopted or translated name.	Russian or German name.							
Acid Repka.....	Riepka Kislaya.....							
Alabaster.....	Alabaster Weisser.....							
Alexander.....			(*)	(*)		(*)	(*)	
Aport.....	Kaiser Alexander.....							
Alfriston.....	Alfriston.....							
Aloe.....	Saburovskoe.....							
Amber.....	Yantasnoc.....							
Anis.....	Anis.....							
Anisovka.....	Anisovka.....					(*)	(*)	
Anisim.....	Anisimovskoe.....							
Antonovka.....	Antonovka.....	(*)	(*)	(*)		(*)	(*)	(†)
Aport.....	Aport.....							
Arabka.....	Arabskoe.....	(*)				(*)	(*)	
Arabka (Eilwanger and Barry).	Arabskoe.....							
Arkad.....	Arkad.....							
Aromatic.....	Tchutilotchnoe.....							
Aromatic Spike.....	Krivospitsoe Aromatnoe.....							
Autumn Aport.....	Osennui Aport.....							
Autumn Pear.....	Grushevka Osennaya.....							
Autumn Streaked.....	Herbst Streifling.....	(*)					(*)	(†)
Avenarius.....	Süssapfel von Avenarius.....							
Barloff.....	Barlovskoe.....	(*)						
Basil the Great.....	Vasilui Velikui.....	(*)				(*)	(*)	
Batullen.....	Batullenopfel.....						(*)	
Baumann.....	Baumann's Reihette.....							
Beautiful Arkad.....	Arkad krasivui.....	(*)				(*)	(*)	
Bell or Melon.....	Svonkoe ili Dinnoe.....							
Beresina.....	Berezinskoe.....							
Bergadorf.....	Bergadorvskoe.....							
Bergamot.....	Bergamotnoe.....							
Berry.....	Riabinovka.....	(*)				(*)		
Biel.....	Biel.....							
Bielgorod.....	Biel gorodskoe.....							
Blackwood.....	Tcheinoe Derevo.....					(*)		
Blue Anis (A. G. Tuttle)								
Blushed Calville.....	Kalvil Krasnui.....					(*)		

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Adopted or translated name.	Russian or German name.							
Bode.....	Bodeveskoe.....							
Bogdanoff.....	Bogdanoff (Rieпка).....							
Bogdanoff's Glass.....	Steklianka Bogdanova.....					(.)		
Boiken.....	Boikenapfel.....							
Bokovoe.....	Bokovoe.....							
Borkoff.....	Borkovskoe.....							
Borovinka.....	Borovinka.....	(.)						
Borsdorf.....	Borsdorfer.....					(.)	(*)	
Bosklonoff.....	Bosklonovka.....	(.)				(.)		
Breskovka.....	Breskovka.....							
Broadcheek.....	Schirokolitchiko.....					(.)		
Broad Green.....	Nalivnoe zelenui schirokui.....							
Burlovka.....	Burlovka.....							
Buschbohn.....	Buschbohn.....							
Cardinal.....	Kardinal.....							
Champagne.....	Champanskoe.....							
Champagne Pipka.....	Pipka Champanskaya.....						(*)	
Charlamoff.....	Charlamovskoe.....							
Christmas.....	Roshdestvenskoe.....		(*)			(.)	(*)	
Cinnamon.....	Koritchnevoe.....							
Cinnamon Anis.....	Anis Koritchnevoe.....					(.)		
Cinnamon Pine.....	Koritchnevoe Ananasnoe.....							
Citronat.....	Citronat.....						(.)	
Citronen.....	Citronenapfel.....							
Crimea.....	Crimea.....							
Crimean Naliv.....	Krimskoe Nalivnoe.....							
Crooked Spike.....	Krivospitsoe.....					(.)		
Cross.....	Skrijapel.....							
Czar's Thorn.....	Tsarskui Schip.....					(.)		
Dansic Pipka.....	Pipka Dantsigskaya.....					(.)		
Earliest.....	Skorospielka Rannaya.....							
Early Champagne.....	Champagner Früher.....							
Early Cinnamon.....	Koritchnevoe Rannee.....						(*)	
Early Grandmother.....	Babuschkino Rannee.....							
Early Pipka.....	Pipka Lietnaya.....							
Early Prolific.....	Plodovitka Rannaya.....					(*)		

Early Red.....	Skorospieloe Krasnoe.....							
Early Stripe.....	Polosatka Lietnaya.....							
Early Translucent.....	Skvosneena Skorospelaya.....							
Eiser.....	Eiserapfel.....							
English Borovinka.....	Borovinka Angliskaya.....					(*)		
English Pippin.....	Englischer Pepping.....							
Enormous.....	Krupneena.....						(*)	
Erdbeer.....	Erdbeerapfel.....							
Flat Miron.....	Miron Ploskui.....							
Flat Voronesh.....	Voroneshkoe Ploskoe.....							
Fonarie.....	Fonarik Nalivnui.....							
Garden.....	Sadovskoe.....					(*)	(*)	
Gedlamuter.....	Gedlamuter.....							
General Greig.....	General Greig.....						(*)	
German Calville.....	Niemetskui Kalvil.....	(* ?)						
German Ledenets.....	Ledenets Niemetskui.....							
German Prolific.....	Plodovitka Niemetskaya.....							
German Skrute.....	Skrute Niemetskui (Regel).....							
Getman's Bean.....	Getmanskui Bob.....	(*)				(*)		
Gipsev.....	Tsiganka.....							
Glass.....	Steklianka.....						(*)	
Glints.....	Glintsovo.....							
Golden Arcad.....	Zolotoi Arkad.....							
Golden Reinette.....	Zolotoi Renet.....							
Golden White.....	Biel Zolotovskaya.....	(*)		(*)		(*)	(*)	
Good Peasant.....	Dobruj Krestianin.....					(*)	(*)	
Gorko Pipka.....	Pipka Gorkaya.....							
Grandmother.....	Babuschkino.....					(*)	(*)	
Great Mogul.....	Vilikui Mogul.....							
Green Anis.....	Anis Zelenui.....							
Green Astrachan.....	Astrachanskoe Zelenoe.....							
Green Butskaya.....	Butskaya Zelenka.....							
Green Crimean.....	Krimskaya Zelenka.....							
Green Glass.....	Steklianka Zelenka.....						(*)	
Green Rubets.....	Rubets Zelenui.....							
Green Stranger.....	Tchujenka Zelenaya.....							
Green Streaked.....	Zelenka Polosataya.....					(*)	(*)	
Green Transparent.....	Skvosnoi Zelenui.....						(*)	
Green Sweet.....	Zelenka Sladkaya.....							
Grosser Bohn.....	Grosser Bohnapfel.....							
Half Glassy.....	Polusteklianka.....					(* ?)		
Handsome White.....	Biel Krasavitsa.....	(*)						
Hare Pipka.....	Saitchia Pipka.....							
Hare's Head.....	Hasenkopf (Saitchia Golova).....							
Heidorn.....	Polosatka Heidorna.....	(*)						
Herren.....	Herrenapfel.....							
Hibernal.....	Osmui.....			(*)		(*)	(*)	
Imperial.....	Imperial.....							
Imperial Citron.....	Tsitronnoe Tsarskoe.....							
Imperator.....	Imperatorskoe.....					(*)		
Ivory.....	Sinnui Biel.....							
Kalkidon.....	Khalkidonskoe.....							

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Karabovka	Karabovka					(*)		
Keiv Reinette	Renet Keivskui					(*)		
King's Stripe	Rothstrahliger König							
Kluevskoe	Kluevskoe							
Kolomenskoe	Kolomenskoe							
Kremer	Kremerskoe							
Kremer's Glass	Steklianka Kremera					(*)		
Kruder	Kruder oder Blauer							
Kursk Anis	Anis Kurskui						(*)	(†)
Kursk Reinette	Renet Kurskui							
Kustoe	Kustoe							
Landsburg	Landsburger Reinette							
Lapouchoe	Lapouchoe							
Lapouchoe Naliv	Lapouchoe Nalivnoe						(*)	
Large Anis	Anis Krupnui							
Large Long White	Biel Krupnaya Prodolgovatnaya							
Large Prolific	Plodovitka Krupnaya							
Large Transparent	Krupnui Skvosnoi Naliv							
Lead	Svintsovka						(*)	(†)
Ledenets	Ledenets							
Leipsic Borsdorf	Borsdorfer Leipziger						(*)	
Lejanka (Lieby)	Lejanka						(*)	
Lemon	Limonne							
Livland Muscatel	Muscatapfel Livlander					(*)		
Livland Raspberry	Himbeerapfel Livlander					(*)	(*)	
Lipin	Lipinskoe							
Lipka	Lipka							
Little Hat	Schapotchka					(*)		
Little Pipka	Pipka Malaya							
Little Repka	Reipka Malenkaya			(*)		(*)	(*)	
Long	Dlinnoe							
Long Arcad	Arkad Dlinnui						(*)	
Longfield	Langerfeldskoe	(*)				(*)	(*)	
Lubsk Reinette	Reinette Liubskui					(*)		
Luiken	Luikenapfel							
Marble	Marmornoe					(*)		

Markovka	Markovka							
Marmalade	Marmeladnoe							
Meadow	Borovinka, Borovinka Lugovaya?					(*)		
Melon	Melonenapfel							
Melon or Nun	Melonen oder Nonnen							
Melon or Bell	Dinnoe ili Zvonkoe							
Mensk	Mtsenskoe						(*)	
Moscow Pear	Gruschevka Moskovskaya							
Mottled Anis	Anis Pestru					(*)		
Muller's Spitz	Muller's Spitzapfel							
Multicolor	Pestrichka						(*)	
Muscatel?	Muschkatelnoe					(*)		
Muscatel Reinette	Reinette Muscateller							
Nasiedka	Nasiedka							
Neelovskoe	Neelovskoe?					(*)		
Neumeister	Neumeister							
Nicolai (Am.)	Nasliednik Nikolai Aleksandrovitch					(*)		
Nitchner's Strawberry	Nitchner's Erdbeerapfel							
Noble Redstreak	Edler Rosenstreifling	(*)				(*)	(*)	
Novgorod Streaked	Polosatoe Novgorodskoe							
Oldenburg		(*)	(*)	(*)	(*)	(*)	(*)	(*)
Orloff	Orlovskoe					(*)		
Osimoe	Osimoe							
Ostrokoff	Ostrokovskaya Steklanka	(*)				(*)	(*)	
Painted	Rospisnoe							
Painted Anis	Anis Rospisnoe							
Painted Arcad	Arkad Rospisnui							
Painted White	Biel Rospisnaya							
Pear	Gruschevka							
Pendent Ear	Vislouchoe							
Persian	Persian							
Peterhoff	Peterhovskoe	(*)						
Petrovskoe	Petrovskoe							
Pickle	Motchetchnoe							
Pineapple	Ananasnoe					(*)		
Pipka	Pipka							
Pointed Pipka	Pipka Ostrokonetchnaya					(*)		
Polish Cinnamon	Koritchnevoe Polskoe							
Polish Prolific	Plodovitka Polskaya							
Polumiron	Polumiron							
Poniavinskoe	Poniavieskoe							
Popoff	Popovka Polosataya							
Possart	Possart's Nalivia					(*)		
Potainoe	Potainoe							
Pound	Funtovoe							
Prolific	Plodovitka	(*)						
Prolific Anis	Anisovaya Plodovitka							
Prolific Sweeting	Plodovitka Sladkaya	(*)					(*)	
Putim	Putimskoe							
Pyriiform	Gruschaobrasnoe							
Queen Louise	Königin Louise							
Rambour Reinette	Russkui Ramburovui Reinette						(*)	

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Raspberry.....	Malinovskoe.....					(*)	(*)	
Rasumoff.....	Rasumovskui Moschok.....							
Rattle.....	Grenuschka.....							
Red Anis.....	Anis Krasnui.....	(*)		(*)			(*)	
Red Arcad.....	Arkad Krasnui.....							
Red Astrachan.....	Astrachaner Rother.....					(*)	(*)	
Red Black.....	Tchernokrasnoe.....						(*)	
Red Borovinka.....	Borovinka Krasnaya.....							
Red Jungfern.....	Rother Jungfern.....							
Red Miron.....	Miron Krasnui.....							
Red Naliv.....	Nalivnoe Krasnoe.....							
Red Petersburg.....	Petersburgskoe Krasnoe.....							
Red Pigeon.....	Rother Winter Taubenapfel.....							
Red Pine.....	Ananasapfel Rother.....							
Red Raspberry.....	Malinovka Krasnaya.....							
Red Reinette.....	Reinette Rother.....					(*)	(*)	
Red Rukin.....	Rukinskoe Krasnoe.....							
Red Serinkia.....	Rother Serinkia.....					(*)	(*)	
Red Sided.....	Krasnobokoe.....					(*)	(*)	
Red Streak.....	Polosatko.....	(*)						
Red Summer Calville.....	Kalvil Krasnui Lietnui.....							
Red Sweeting.....	Kras Sladkaya.....							
Red Titka.....	Titka Krasnaya.....							
Red Transparent.....	Skvosnoi Krasnui.....					(*)	(*)	
Red Wine.....	Weinapfel Rother (Herbst-Regel).....							
Repka.....	Riepka.....							
Repka Aport.....	Rieptchatui Aport.....							
Repka Arcad.....	Arkad Rieptchatui.....							
Repolovka.....	Repolovka.....							
Resonant.....	Zvonkoe.....							
Revel.....	Revelskoe.....							
Revel Borsdorf.....	Borsdorfer Revaler.....							
Revel Glass.....	Steklianka Revelskaya.....							
Revel Pear.....	Grushevka Revelskaya.....							
Revel Pigeon.....	Taubenapfel Revaler.....						(*)	
Revel Streaked.....	Revelskoe Polosatko.....							

Ribbed	Rebristoe						
Ribbed Naliv	Rebristoe Nalivoe						
Ribbed Rubets	Rubets rebritsui nalivnoi						
Richard	Grand Richard						
Riepovka	Riepovka						
Riepolovka	Riepolovka						
Riga Translucent	Skvosneena Rishskaya						
Riga Transparent	Rigaer Skvosnoi Naliv						
Romanoff	Romanovka						
Romenskoe	Romenskoe, also Romnenskoe				(*)	(*)	(f)
Romianka	Romianka						
Rosenhager	Rosenhager						
Rosy	Rosovoe						
Rosy Aport	Aport Rosovui					(*)	
Rosy Repka	Riepka Rosovaya						(f)
Rosy Voronesh	Voroneshskui Rosovui						
Round Borsdorf	Borsdorfer Runder						
Royal	Korolevskoe						
Royal Table	Fürstlicher Tafelapfel				(*)		
Rshev's Miron	Miron Rshevski						
Rubets	Rubets						
Russian Calville	Kalvil Ruskui						
Russian Gravenstein	Gravensteiner Russischer	(*)			(*)		
Sandy Glass	Pesotchnoe Stekljanovoe						
Saxonian?	Saksonscoe ??				(*)	(*)	
Scented	Duchovoe					(*)	
Scented White	Biel Duchovaya						
Serinkia	Sierianka						
Sheepnose	Schafnase						
Shepherd	Pastichovka						
Shining Aromatic?	Steklannoe Duchistoe?					(* ?)	
Silken	Schelkovka				(*)	(*)	(*)
Skrute	Skrute						
Slast	Slast						
Smoky Arcad	Arkad Dimtchatui						
Smolensk	Smolenskoe						
Spreading Pipka?	Pipka Postilnaya						
Stepanoff	Stepanovka						
Streaked Naliv	Polosatoe Nalivnoe						
Striped Calville	Kalvil Polosatui						
Striped Naliv?	Polosatka Nalivnaya						
Stupka	Stupka						
Sugar Miron	Miron Sacharnui						
Sugar Sweet	Sacharnoe				(*)		
Sultan	Sultanapfel				(*)	(*)	
Summer Aport	Aport Lietnee	(*)					
Summer Livland	Livlandischer Sommer					(*)	
Summer Pear	Sommer Birnapfel						
Svinets	Svinets						
Swan	Lebedka						
Sweet Anis	Anis Sacharnui					(*)	
Sweet Aport	Aport Sladkui						

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Sweet Borovinka	Borovinka Sladkaya							
Sweet Cross	Skrijapel Sladkui							
Sweet Mensk	Mtenskoe Sladkoe							
Sweet Pear	Grushevka Sladkaya							
Sweet Pipka	Pipka Sladkaya		(*)			(*)	(*)	
Sweet Prolific	Plodovitka Sladkaya							
Sweet Streaked	Polosatoe Sladkoe							
Switzer	Suislepper	(*)				(*)	(*)	
Tashkin	Tashkinskoe							
Tetofski								
Thaler	Charlottenthalskoe Jeltoe	(*)				(*)	(*)	(*)
Thin Twig	Tonkovietka Polosataya							
Three-sided	Tchereztschnomnoe							
Tiesenhausen	Tiesenhausenskoe							
Titovka	Titovka	(*)	(*)			(*)	(*)	
Translucent	Skvosneena							
Transparent Astrachan	Astrachanskoe Skvosnoe							
Transparent Naliv	Skvosnoi Naliv							
Ukraine	Ukrainskoe					(*)	(*)	
Vargul	Vargul							
Vargulek	Vargulek					(*)	(*)	
Vinnoe	Vinnoe							
Visotskoe	Vuisodskoe (Visotskoe)							
Vochin	Vochinskoe							
Vochin's Crimean	Krimskoe Vochina					(*)		
Vorgunok	Vorgunok							
Voronesh Arcad	Voroneshskoe Arkad							
Voronesh Cinnamon	Voroneshskoe Koritchnevoe							
Voronesh Reinette	Reinette Voroneshskui							
Vorschtapel	Vorschtapel							
Watermelon	Arbuzovskoe							
Waxen	Voskovoe						(*)	
Waxen Arcad	Arkad Kruglui Voskovui							
Waxen Naliv	Naliv Voskovoi							
White Aport	Aport Bielui							
White Astrachan	Astrachaner Weisser						(*)	

White Borodovka	Biel Borodovskoe							
White Crimean	Krimskaya Biel						(*)	
White Naliv	Nalivnoe Bielni						(*)	
White Pelikanoff	Biel Pelikanovskaya							
White Pigeon	Golubinoe (Vloenot Regel)	(*)				(*)	(*)	
White ReINETTE	ReINETTE Bielui							
White Rubets	Rubets Bielui							
White Russett	Bielovoe Jeltosieroe	(*)				(*)	(*)	
White Skrute	Skrut Bielovoi					(*)		
White Summer Calville	Calvill Weisser Sommer					(*)		(†)
White Swan	Bielaya Lebedka							
White Sweet	Bieloe Sladkoe							
White Transparent	Skvosnoi Bielui	(*)					(*)	
White Vochin	Biel Vochina	(*)						
Wine Rubets	Rubets Vinogradnui	(*)						
Winter Aport	Aportovoe Simovoe							
Winter Glass	Stekliannoe Simovoe					(*)	(*)	
Winter Livland	Livlandischer Winter						(*)	
Winter Pear	Winter Birnapfel						(*)	
Winter Streaked	Polosatka Simnaya						(*)	
Yellow Anis	Anis Jeltui					(*)	(*)	
Yellow Arcad	Arkad Jeltui					(*)		
Yellow Calville	Kalvil Jeltui	(*)				(*)		
Yellow Keiv	Kievskoe Jeltoe							
Yellow Lemon	Limonnnoe Jeltoe							
Yellow Naliv	Jeltui Naliv							
Yellow Prolific	Plodovitka Jeltaya							
Yellow Stettin	Gelber Stettiner							
Yellow Sugar	Sacharnoe Jeltoe					(*)		
Yellow Sweet	Sladkoe Jeltoe							
Yellow Transparent	Skvosnoi Jeltui	(*)	(*)	(*)		(*)	(*)	
Zakoritnoe	Zakoritnoe							
Zelenka	Zelenoe, Zelenka							
Zolotareff	Zolotarevka					(*)	(*)	
Zussoff	Jussow's Winterapfel					(*)	(*)	

In addition to these very many are referred to by numbers, but in such manner that it is difficult, if not impossible in most cases, to determine to which list they properly belong. Numbers and duplicates are excluded from this tabulation, and the names arranged alphabetically, with the hope to hasten the disuse of numbers, and in so doing escape a fruitful and vexatious source of error.

It is quite generally conceded that these Russian importations have yielded several early varieties of apples fully equal, if not in some respects superior, to any of our older native varieties of similar season, and that these are hence likely to prove valuable even in regions in which their superior hardiness is not specially important.

The most serious complaint respecting these importations as a whole is found in the fact that in the latitude of southern central Iowa, to which they come mainly from a region lying from 8° to 12° farther north, the transfer to a more southern and longer summer so hastens the maturity of their fruit, that the most of them become late summer and autumn fruits, failing partially, if not wholly, of a winter supply, which would be more specially desirable.

Although the full import of such change can only be determined upon the general distribution and fruiting of these introductions, which must yet require several years, this claim (which receives more or less confirmation from the fruiting of some of the earlier introductions) finds much support from the behavior of our native varieties, when thus transferred, even for short distances, within our own country.

It is urged, on the other hand, that while southern Iowa and Nebraska can depend with more or less certainty upon their ability to produce a supply of this fruit from some of the hardiest of our American varieties, farther north these utterly fail, and that in such localities, even including whole States and Territories, the question, practically is, *apples or no apples*, while with their shorter seasons the objection of pre-maturity partially or wholly disappears.

It is also very forcibly urged that the objections are being made upon results from the earlier importations, which mainly came from near the sea-coast, where the climate differs widely from that of the steppes, whence the later and mainly untested importations have come; also that the alleged pre-maturity can not be properly estimated by degrees of latitude, but rather by isotherms; and that from this stand-point, if we trace the lines of equal summer temperature (as a guide to determine the relative seasons of ripening), the season of central Iowa will be found to correspond with that of the region in southeastern Russia, 10° or 20° farther north, whence the mass of these later importations came.

In urging this consideration, Professor Budd insists that "so far as the winter apples of south central Russia have yet fruited in Iowa, they prove as good keepers as in their native home. In like manner, our samples of fruits and our reports from our many trial stations north

show that the apples from provinces in Russia farther north than Saratov mature almost exactly in accordance with the lines of summer heat traced by Professor Dove across the two continents."

Should the conclusion be accepted that the season of maturity is dependent rather upon thermal lines than upon parallels of latitude, it appears equally probable that variations of flavor or quality are similarly affected. Although this may lack the authority of a determinate conclusion, it may be supposed to warrant the inference that the recognized deficiency of quality in the sea-coast varieties first imported was the result of causes not to be predicated of those more recently introduced, which may, in such case, be expected to more nearly retain their pristine characteristics. For these reasons, if for no others, it would seem wise to give to these the benefit of a full and fair trial before sitting in judgment upon them.

Besides the recommendations of particular varieties already tabulated, there are numerous notices, both favorable and unfavorable, which more or less fully indicate in what lights these, as a class, are viewed by those interested in such matters. In quoting a few of these the localities in which they occur will be indicated.

Dr. T. H. Hoskins, of northern Vermont, in *Rural New-Yorker*, says:

I have fully 100 varieties of Russian apples growing in my grounds, many of the trees being sixteen and eighteen years planted, while some of the later importations are small. One thing is fully demonstrated, viz, that these apples are, as a class, very much hardier against adverse climatic influences, and especially against winter's cold, than those previously grown on this continent. This alone gives them enormous value for the "cold North" where, without them, tree fruit culture would be impossible. In productiveness, size, and beauty of fruit the Russian apples are, on the average, more than a match for those of western Europe and for our native seedlings thence derived. Those who have an extensive acquaintance with Russian apples know that there is among them quite as large a proportion which deserve to rank as of dessert quality as there is among the common sorts.

An article from the same pen, published in the *American Garden*, in September last, indicates a possible change in the writer's conclusions upon the subject. He says:

The entire "cold North" is awaiting with anxiety the coming iron-clad long-keeping apples, which it so greatly needs, yet can hardly produce. Experience is showing that the Russian long-keeping apples grown between latitudes 55° and 65° are not long keepers in latitudes 40° to 50°, which is the American territory where the iron-clads must be grown.

George P. Pepper, of the Lake region of eastern Wisconsin, says:

Nearly all the Russian apples I have fruited ripen in summer or early autumn, and retain their flavor but a short time. Antonovka gives the best satisfaction of any yet fruited. There are some winter [reputed—WRITER] apples among those not yet fruited.

He says again:

The public will find that there is as much risk in planting Russian varieties as any others. I hold that fruit trees, to give satisfaction, should be grown from seed raised near the locality where wanted.

George J. Kellogg, reporting as delegate from Wisconsin to the Illinois Horticultural Society, remarks: The apple question in Illinois is but little nearer solved than in Wisconsin and Minnesota. Half the orchards in northern Illinois are on the wood-pile and the other half are leaning strongly that way.

A. G. Tuttle, of central Wisconsin, says:

We have been a good many years trying to learn what is in the Russian apples, and have tested 150 varieties, which certainly compare with the varieties usually grown in Wisconsin. Some are equal in quality to the Northern Spy and Grimes' Golden. We have scarcely two varieties that are not better than Oldenburg.

He adds:

So far as the south half of Iowa is concerned, my impression is that they do not need Russian apples. I am speaking more particularly about the cold northern climate.

On another occasion he remarks:

I have 80 varieties of Russian apples in orchard. All seem hardy but one.

Again says Mr. Tuttle:

The true crabs are tender. They start too early; wake up too soon.

At the Minnesota State Fair, in 1886, Mr. A. G. Tuttle, of Wisconsin, exhibited 75 varieties of Russian apples, probably the most extensive display of this class of apples ever made by a single grower in the United States.

Of these the examining committee speaks as follows:

The best keepers shown here were Repka, Arabskoe, Mensk, Vargul, Antonovka, and Blue Anis.

In quality they rank as follows:

Vargul, Antonovka, Repka, Blue Anis, Mensk, Arabskoe. The samples were too immature to judge of flavor, but Vargul and Antonovka, which resemble each other, are much finer in texture and evidently much better than Oldenburg. [Not very high praise.—WRITER.]

In size, Mensk, Arabskoe, Vargul, and Antonovka are said to be large apples, Blue Anis is medium, and Repka is small.

Arabskoe has blighted in twigs; but otherwise the above are said to be thus far free from blight, and all are as hardy as Oldenburg.

Among the early winter sorts, the committee was most pleased with Golden White. The season of Hiberna, Zussoff's Winter and Red Queen (December); Long Arcad (November and December). In quality this test ranks, Golden White, Long Arcad, Zussoff's Winter, Red Queen, Hiberna.

In making a report a member of the committee remarks:

In conversation Mr. Tuttle admitted that blight is the greatest enemy of the Russian varieties. We could not tell from the looks of the fruit how much the trees blighted; but from my own experience, I find that those varieties that do not kill by blight do not bear very much.

At the annual meeting of the Minnesota Horticultural Society in January, 1887, Mr. Tuttle exhibited four sections of the wood of crabs,

nine sections of hardy native apples, and twenty-five sections cut from Russian apple-trees. The sections were said to have been cut from trees which had been planted ten years, and to be fair samples of each variety; and were reported by the examining committee as giving evidence that twelve of the Russian varieties were hardier than Oldenburg, or any of the American varieties.

On another occasion Mr. Tuttle says:

At least twenty-six varieties of Russians will compare favorably with Oldenburg for hardiness, and are as good in quality as an equal number of American varieties.

Menominee is situated at the north of Menominee River, on Green Bay, just upon the boundary between Wisconsin and the upper peninsula of Michigan, partaking largely of the climatic peculiarities of the latter. Mr. S. Running reports from there:

The thermometer last winter (1886-'87) sank to -40° and below, and remained there for about a week; but that is less than has been usual for the past three years. I have just come in from examining the trees, and find the following, which I have growing in the nursery row, to be entirely hardy: Lou, Florence, October, Martha (received from P. M. Gideon, of Minnesota), Whitney, Hibernial, Ostroloff's Glass, also Hyslop, Transcendent and Marengo crabs. Then follow Oldenburg, Tetofski, Yellow Anis, Charlamoff, and Little Pipka, with the terminal bud and an inch of wood slightly discolored. Then come Thaler, Yellow Transparent, Prolific Sweet, McMahon's White, Scott's Winter, and Iowa Russett, with a trifle more discoloration. Then come Iowa Blush, Wealthy, Alexander, Longfield, and Switzer, with still more discoloration. Lastly, I think Borsdorf, Wolf River, Walbridge, Plumb's Cider, St. Lawrence, and Fall Orange are too tender for this locality.

I also have Clapp's Favorite, Flemish Beauty, and Keiffer pears growing in nursery rows, all of which are killed to last winter's snow-line.

J. C. Plumb, of Wisconsin, in the *Prairie Farmer*, says:

Where the once despised Oldenburg and little Siberians were thought too inferior for general planting, they now make all—and often a good all—of the home supply of apple fruit. Where this is the rule, the new Russians are a Godsend. They have come to stay, and will no doubt immensely extend the area of successful apple-growing in the Northwest. We have been growing them about twelve years, and yearly examining and testing new varieties as they have come into fruiting; and, as is known here, have been very cautious in our commendation of them, for they have serious faults as well as great virtues. I have yet to see a good long-keeping apple among them. The "very hardy" are all too coarse fleshed to be good winter fruit; nor do I expect to find any Seek-no-Further, Grimes' Golden or Winesaps among them for reasons physiological, which I have not room here to discuss.

In the same issue Mr. Tuttle quotes Hon. C. L. Watrous, of Des Moines, Iowa, as saying:

Of the 300 varieties of apples on trial a few have fruited; and, with a single exception, the fruit has been of the very lowest quality—thin, sour, and poor; with, too often, a twist of bitterness simply atrocious.

In replying to this Mr. Tuttle remarks:

That all of the 100 varieties fruited are of the very best quality no one would claim; but that they are, as a collection, equal in quality to our American apples there is not a shadow of doubt. * * * The percentage of loss in my Russians, including over 100 varieties, is not one-tenth of that in my orchard of Oldenburgs of 300 trees.

In southern Iowa, whence the doubts respecting the value of the Russian importations seem mainly to arise, Hon. C. L. Watrous says:

I do not think it is the general belief of the men of this (Iowa Horticultural) society that the Russians are going to produce a winter apple that will be hardy here in Iowa, and I think we should be very careful of our utterances on the subject.

R. D. McGeehon, of southwestern Iowa, remarks:

I am at a loss to say what apples I should plant. If Professor Budd has not got them among his Russians, I do not know where to look for them.

Professor Budd states:

We have 800 experimental stations throughout the Northwest; and we have gone through tests, and arrived at conclusions on this subject such as we could not have reached in a quarter of a century by ordinary means. From these importations from Russia we expect to get quite a number of varieties as good in quality as Grimes' Golden.

The work at the college consists chiefly in testing new varieties from Europe and elsewhere. Cuttings and seeds from these are sent out to the stations under an agreement not to propagate, sell, or give away any stock received for trial.

In the Rural New Yorker of October 1, 1887, Professor Budd says in substance:

We find the Longfield apple to be a native of Sarepta, on the Lower Volga, where the rain-fall is light and the summer heat often reaches 106° in the shade, with only 20 per cent. of moisture in the air.

Literally without rain to wet the roots of plants, the Longfield, and its near relative the Good Peasant, have matured a full crop of fruit of nearly average size. Even as far north as Baraboo, Wis., the Longfield has stood quite as well as the Wealthy, although this has not missed a crop of fruit on Mr. Tuttle's place for the last six years. The Longfield is not a true iron-clad for the North; but, if not cut too severely for scions, it has stood fully as well as the Wealthy on dry soils.

So far in central Iowa the Bogdanoff has shown no defect, save an occasional show of twig blight on black soil and in sheltered positions. Grandmother (469 Department list) failed with us in 1884 and 1885, and we have dropped it from our trial list; but the Grandmother, received by us from Moscow and Varonesh, appears to be as hardy as Oldenburg, and promises to be a true iron-clad for northern Iowa. I think the true Grandmother will prove hardy in any part of Vermont, yet it may not be as perfectly at home there as in Iowa.

Red Astrachan is a Swedish apple, a supposed seedling of Red Transparent. The latter is hardier than Oldenburg, but Red Astrachan is very little hardier than Fameuse. The Department Borsdorfs lack hardiness, but Zweibel Borsdorf of central Russia is a true iron-clad. Alexander is hardy at Ames, but especially subject to blight and a shy bearer. On the other hand, the Aports of central Russia are perfect in tree, good bearers, and some of them fairly good keepers.

In the report of the Iowa society for 1886 appears the following:

On ordinary prairie soils, over an extent of the West equal to half a dozen of the small kingdoms of Europe, the home and commercial orchards are killed or hopelessly crippled to an extent not heretofore known in the history of this country or any other. Timber soils have not sustained their reputation as favorable orchard-sites in Iowa, Indiana, Wisconsin, or Illinois. Even so far south and east as La Fayette, Ind., the fine young orchard on the grounds of Purdue University has been grubbed, without the reservation of a single tree, although it stood on hard maple land, which had hitherto been thought favorable for the apple and the cherry.

It is further stated that the injury of so-called hardy varieties was not in the top; that trees top-worked on hardy stocks were comparatively sound, even though the same varieties root-grafted failed to show a perfect leaf. It is also stated that the most successful apple-trees at the West generally, on various soils, have been of Russian or Siberian stock.

In 1887 E. B. Porter, of Delaware County, Iowa, reports :

That the old orchards are dead is a fact that stares us in the face from Indiana to Nebraska and south to central Illinois and northern Missouri. Some imagine that we in northern Iowa are peculiarly unfortunate in this regard, but there has not been a crop of apples raised in central Illinois in five years.

The report says further, in effect :

Through the progress of centuries the apple has become acclimatized throughout Europe. The great central plain of Russia is very similar to our great central plain. There the summers are hot enough to perfect Indian corn; the rain-fall is not greater than ours. There the mercury sinks lower than here in winter, and reaches at least as high in summer. There, as here, the winds sweep down from the Arctic Ocean with no intervening mountains. These facts are held to justify the expectation that out of the importations from those regions will come a supply of varieties adapted to meet the requirements of our climate; and among these are mentioned Yellow Transparent, Tetofski, Thaler, Longfield, Antonovka, and others.

J. B. Mitchell, living near the north line of Iowa, who has had thirteen years' experience and has a hundred varieties of Russian apples, in replying to Mr. Watrous in the *Prairie Farmer* says :

With Mr. W.'s experience, in a more favorable locality for the growing of the old varieties of apples (130 miles south of me), there may be some reason for his conclusion of their relative hardiness and healthfulness as compared with the Russian apples. The latter are more dwarf and slower growers generally than the former, and where the climate will admit of growing the old or American varieties they doubtless make a better appearance in nursery. But here at the north line of the State the old varieties are not to be compared with the Russian in hardiness, healthfulness, and fruitfulness. Many of the latter have come through the winters nearly perfect, while of thousands of trees of the American varieties planted in this vicinity all have disappeared. It is not claimed by Professor Budd, or any one I believe, that all of the Russians are hardy enough for the North, or that all will endure the heat farther South; but there are very few of those tried here which have not stood better than any of the American sorts. Many of them are indispensable to the Northwest; and it is a stubborn fact that they have come to stay, even if the fruit is not all of the first quality. Of those I have fruited, with two exceptions, I have noticed none of the bitterness spoken of, and then only a slight trace, while some are of very fine quality, and I think they will average well with the old kinds. Nearly all said against the Russians has come from localities farther south, where the old varieties have done very well, and where extreme hardiness is not so essential.

H. Friedly, Mineral Ridge, Iowa, has been growing apples a number of years, and has the finest and largest bearing orchard in Boone County; but the recent cold winters killed all except a few Russians. He then procured from the college eighteen varieties of Russian apples, which he planted in 1884. Six of these have now produced fruit, which is of fine appearance, and compares well with our common varieties. Root-grafts of fifty additional varieties, more recently planted in nursery, have all proven hardier than our common varieties beside them.

W. C. Haviland, of Fort Dodge, Iowa, in *Prairie Farmer*, says :

The days of Grimes' Golden and Jonathan are past ; and of the tried sorts we only have Wealthy and Whitney left. Already the half-hardy sorts, like Fall Queen (Haas) and Fameuse, have given place to Russians, such as Yellow Transparent and Longfield, which prove 20 per cent. hardier. He mentions a few others in the order of their relative hardiness, so far as known, viz: Antonovka, Cross, Hibernial, Arabskoe, Borovinka, Arabka, Charlamoff, Switzer, Yellow Anis, Red Anis, Silken, Thaler, Longfield, and Little Pipka.

Edward Reeves, Waverly, Iowa, takes the following conservative and doubtless correct view of the matter in *Prairie Farmer*, page 618 :

I think it high time to warn planters against the present craze for Russian trees, or trees from any other place which have not been fully tried in our climate and proven of value. At the meeting of the Iowa Horticultural Society at Charles City, last winter, Mr. Watrous asked Mr. A. G. Tuttle to name the varieties of Russian apples which had proven of value in Iowa ; but he failed to name a single one. * * * I have over forty varieties of Russian apples on my grounds, a number of which have so far stood better than Oldenburg ; but I am not prepared to recommend them to my customers, except for trial. I believe that some of these will prove valuable for general planting and for crossing.

In *Prairie Farmer*, page 634, John C. Ferris, secretary Northern Iowa Horticultural Society, says :

My experience with Russian apples is very much at variance with that of Captain Watrous. It is well known that the list of apples recommended for northern Iowa, by the Northern Iowa Horticultural Society, includes but four varieties from the old list, viz: Oldenburg, Tetofski, Whitney, and Wealthy. If the last two are hybrids, as claimed by their originators, then, the other two being Russians, there is not an apple of American origin and parentage on our list. We saw no reason why the two Russians first introduced should necessarily be the best ; and hence were glad when many varieties were imported from Russia. These had a perfectly reliable record as to character of fruit, which placed many of them far ahead of either Oldenburg or Tetofski. We began experimenting with these, and their hardiness is now an established fact among northern Iowa nurserymen, who have tested them from four to twelve years.

He goes on to remark that, although we could doubtless in the course of time originate a race of hardy apples adapted to this region, the climate of Russia has performed this work for us, and if we do not avail ourselves of it we will, indeed, be foolish. After a reference to the value of the Russian varieties as the possible basis for further improvement he adds :

The problem for us to solve, after the rejection of the tenderest Russians and those most subject to blight, is, which are the best bearers, the best keepers, and of the best quality.

E. De Hill, president of the Dakota Horticultural Society, assured him that he had eaten Russian apples as good as the Rhode Island Greening.

Hon. R. P. Spear, in *Iowa Horticultural Report* for 1887, says :

In central Minnesota there is usually an abrupt jump from beautiful fall weather to winter ; and the springs also are less changeable than in Iowa. There the crabs and their crosses upon the common apple may be of some value, but in Iowa they are worthless.

On another occasion he says :

In 1874 I procured two each of seventy-six varieties of Russians, and planted them alongside of our hardiest kinds. Some of them have been hurt at the tips, and some are slow growers, but twenty-six of them I consider perfect in tree.

He thinks his trees of the Arabka family will stand at Lake Superior.

In *Prairie Farmer*, page 650, he states that he planted thirteen of the very promising varieties in orchard, and only two of these have proved less hardy than Oldenburg. Two of the hardy varieties have suffered from blight, viz: Basil-the-Great (Vassilist's Largest) and a variety of the Arabka family. Four of the other nine have proved fruitful and very valuable.

I have now more of one, two, and three-year old Russian apple-trees than any other American. I have examined them carefully, after our coldest winters and severest droughts, and am very sure that many of them are more valuable in every respect for Iowa than the Oldenburg.

J. B. Mitchell reports to the Northern Iowa Horticultural Society—

That the once so-called iron-clad list has proved a failure; that none except the Oldenburg have been able to endure the test winters of our climate; and from the fact that many of the Russians have been grown at the most northern limit of our State for ten or twelve years past, and have stood uninjured, or nearly so, in nursery and orchard, it seems that we have much to hope from the Russian apple.

At the same meeting A. L. Hatch remarks :

A good deal of discouragement prevails with regard to standard apples, and what little faith we have left, is in Patton's seedlings and Budd's Russians; and the Lord grant that our faith may prove well founded.

Hybrid crabs are doing well, except the usual amount of blight.

W. H. Guilford, superintendent of Experiment Station, reporting to the Dubuque County Horticultural Society, says :

We purchased thirty-seven trees from the horticultural department at Ames, Professor Budd making the selections for us, and from all that we can learn every tree is of decided merit. The collection is composed of plums, cherries, pears, and apples.

Blessings sometimes come to us in disguise; and it now seems as though the four unprecedentedly hard winters had been such. Nearly all the tender, trashy rubbish with which the country has been littered is either dead or dying, and we have learned a wholesome lesson for our future guidance.

In a report for Grundy County, O. A. Bardahl says :

The county of Grundy is new, compared with other counties in our district, consequently fewer trees have been planted; but I have no doubt that thousands of dollars have been sent out of our county for fruit trees within the last fifteen years, without a single tree to-day giving promise of another apple, except a few Oldenburgs.

The Russians from the college are terribly slow growers, but they afford us our only apparent promise.

Since the fact has come to be recognized that the fruits of the Eastern States are not successful in the prairie regions, there has been a constant effort to devise or discover some effective means for the origination of a local pomology for the supply of the urgent need. Besides the efforts of the national Agricultural Department, which, with Mr. Tuttle and Professor Budd, has undertaken to import a pomology for

the purpose, and the persistent efforts of P. M. Gideon to elaborate the desired result from the crab. Mr. C. G. Patten, of Charles City, the president of the Iowa Horticultural Society, has been an active laborer in this field. While he has done much in the planting and fruiting of the introductions from Russia, he has been but illy satisfied with the results.

A visit to his establishment not only shows sad losses among the old varieties, but also that many of the supposed hardy Russians are seriously defective in hardiness, at least for this locality. The Oldenburg here, as in most other trying localities, is winning a reputation for superior hardiness; but Mr. Patten, not content to stop here, is actively engaged in the work of improvement by the process of cross-fertilization with some already encouraging results.

Prof. E. D. Porter, who is in charge of the University Farm, at the summer meeting of the Minnesota State Horticultural Society, held at that establishment, invited attention to the horticultural improvements, and among other things to the orchard and nursery. There was an orchard of Russian apples, one year planted. The trees had been obtained from Mr. Gibb, of Canada, and Professor Budd, of Iowa. He added:

We have duplicates of these growing from root-grafts in the nursery. The idea is that if there is found to be anything valuable when they come into fruiting we can duplicate them by the hundreds in the nursery. These varieties of apples will be grown for distribution among the farmers and horticulturists of the State.

O. F. Brand, Minnesota:

I had sixty-five varieties of the first that were sent out by the Department, which I propagated, and I got most of them large enough to bear. Where the Wealthy bore, from trees planted the same year, a bushel and a half to the tree in 1881 and 1882, there is not a tree of the Russian varieties that has borne half a bushel. There are several varieties of trees that remained, which were root-grafts in 1874, and some of them were grafted two or three years previous to that. Of those that remain there are only two varieties that are good for anything, and they bear very little. So I class the Russians like this: Most of them blight; and of those that remain, which bear, three-fourths are good for nothing, and the remainder do not bear enough to be good for any purpose, except to make up a collection for a fair.

My experience is that young trees stand very well; and after beginning to bear, at the age of eight to twelve years, are killed out, and the Russians likewise. They may do well for a while, but after they begin to bear and the vitality is reduced, they are unable to stand the winters.

I have eight or ten Oldenburgs that have been planted twenty years this spring, which appear good for as many years more.

To the foregoing Mr. Pearce responds:

Mr. Brand has put Russians in a bad light, and it does not coincide with my observation, nor yet with that of a number of other members present who have orchards in this section of the country. I refer to Andrew Peterson's orchard. He has trees twelve years old, and has twenty-five or thirty Russian varieties. His trees have borne well, and some of the fruit is of fair quality. I have watched his trees with much interest, and have never found trees that were more healthy or prolific. The fruit is large. I have known the Yellow Transparent a number of years. It bears freely, and the fruit is of good quality.

Mr. Corlett adds :

In the spring of 1880 I procured forty-three varieties of Russians from Professor Budd. I divided the collection with five neighbors, at his request, to test them on different soils. My own is what is called high prairie. The past season the branches of several were so loaded with fruit that they required to be propped up to prevent breaking. I had previously successfully grown such varieties as Dominie, Early Harvest, Sops of Wine, Winesap, Ben Davis, Benoni, etc., but none of them are now left, and my only hope is in the Russians.

Peter M. Gideon, of Excelsior :

I got a good many of the Russian varieties in scions, and planted the trees some years ago. The blight destroyed all but three of the trees in the orchard, and the fruit of those proved worthless. Afterward I had some two hundred and thirty varieties, but the blight destroyed most of them. Four years ago I had some seven thousand orchard trees. Over two thousand went down entirely, and others were damaged. I still had twenty Russian varieties left, but two years ago took most of those. Only two of the list bore last season.

The cause of the injury two years since was a severe freeze while the trees were yet in a growing condition.

Professor Porter, of Minnesota, Report for 1881, says :

I think we have much yet to learn in the acclimation of the Russian apple before it will prove entirely satisfactory. That it has some good points all must admit; coming as it does inured to rigorous cold, we hope it may prove all that its most sanguine friends anticipate. With these, as with all other new varieties, we should be cautious concerning extensive planting until fully persuaded that success is perched upon its banners.

Charles Luedloff has under trial about one hundred varieties of Russian apples, together with other fruits, but few of which are yet at fruiting age. He had large fruiting orchards, but the winter of 1884 and 1885 injured them seriously. He is since giving attention to Russian varieties, together with promising local seedlings.

The "*ad interim*" committee of the Minnesota Horticultural Society, on visiting Andrew Peterson, of Carver County, found Hibernial, Ostro-koff, and Lejanka in perfect health and in good bearing condition. Mr. P. thinks Hibernial and Lejanka may prove identical.

In the committee's report they say :

Our observations of Russians lead us to believe that out of the many hundreds of varieties being introduced, we may get a score or so that will be hardy enough for the whole region called the Northwest, and we doubt very much if the quality and productiveness of one-half that number will prove satisfactory to our people, and not more than four or five will fill the bill as long keepers.

Mr. A. W. Sias, reporting on seedling fruits, says :

Mr. Somerville showed us some of the most beautiful apples that our eyes ever beheld; these were new Russians, which we propose to designate Russian Wax, unless we can obtain the true name.

He considers Autumn Streaked as giving the highest indications of hardiness among the Russian apples, and places White Russett as second in this respect, giving the third place to a variety designated as Plikanoff's Small.

He names as the best six Russian apples with him: Autumn Streaked, Russian Green, Juicy Streaked, Green Transparent, Red Cheeked, White Russett.

Best six with William Somerville: Oldenburg, Autumn Streaked, Russian Wax, Charlamoff, Winter Aport, Unknown.

E. H. S. Dartt, in reporting for a portion of southern Minnesota, says:

In regard to Russian varieties, I will say we had a large list of them under cultivation prior to 1885, and I had a good deal of faith in them; but that winter was too much for nearly all of them.

My orchard is Oldenburg and Tetofski, and I believe it has paid me better per acre than any other land that can be found in Steele County that has been used for any other purpose. I have kept account of my apples, and I estimate that my orchard of 18 acres has netted me about \$300 or \$400 per acre, besides trouble and expense and the cost of the land at \$100 per acre. I have a new orchard, set since the hard winter with five hundred Oldenburgs.

At a meeting of the Minnesota Horticultural Society in January, 1887, Professor Porter reported in substance as follows:

In the spring of 1885, root-grafts of one hundred and seventy-nine varieties of Russian apples were obtained from Professor Budd, of Iowa; also fifty-six varieties of two-year-old trees. The experimental orchard stands upon a level piece of prairie, with a low, wet spot in the center, and with an entirely open exposure. Of fifty-two Oldenburg trees but five died; showing that not more than one-third of the Russian varieties are as hardy as Oldenburg. Number of trees planted, one hundred and fourteen, of fifty-seven varieties; $32\frac{1}{2}$ per cent. of the trees are dead.

Thirty-four additional varieties were planted in the spring of 1886. The orchard now contains eighty-one varieties of apples.

Certain varieties have proven worthless, and should be rejected; although some of these may succeed elsewhere. A single station can not therefore do this work satisfactorily. At the farm (near Minneapolis) conditions are essentially different from those farther south. Instead, therefore, of two fruit stations under State control, we need at least four, with dozens of substations.

Some of the Russian importations promise to prove of great value.

A. W. Sias, of Rochester, southern Minnesota, as superintendent of the Experiment Station at that place, says:

In referring to my report of last year, I discover that I erred in not heading it an *obituary notice*. The mortality was so sweeping in its results two years ago that we have but little to report upon at this time. But in this great loss we are again forcibly reminded of that saying so full of meaning to the intelligent horticulturist—"the survival of the fittest."

Without stopping to itemize, I will say that all of our trees with thick, pubescent leaves came through the severe winter two years ago in good shape, and have behaved first-rate ever since, notwithstanding they had to pass through a fiery ordeal last summer. Such trees are equal to every emergency.

At Moorhead, northern Minnesota, R. M. Probstfield reports that he received from Professor Budd the following varieties of Russian apple-trees: Summer Calville?, Ledenets, Royal Table, Romenskoe, Kursk Anis, Lead, Rosy Pipka, Ukraine, and Antonovka, which did well, notwithstanding the hot, dry summer, and went into the winter in good condition.

Transcendent Crab was bearing heavily, but blight was thinning out the trees rapidly.

At Albert Lea, southern Minnesota, Clarence Wedge reports :

Some of these new Russians are pretty well past the experimental stage.

G. W. Fuller, Litchfield, central Minnesota, says :

We had full crops of Early Strawberry, Transcendent, Beach's Sweet, and Minnesota crabs, a very few Oldenburgs, and still fewer Wealthies.

Thomas Frankland, writing from Manitoba, says :

Several varieties of crabs are found to succeed at Hendingly, and out of quite a number of Wealthy apples planted some fifteen years ago two yet survive. Other persons have tried apples ; but having, as I contend, planted unsuitable varieties, they have failed to keep them alive beyond the third year. Some of the Russian varieties give promise of hardiness.

In a paper entitled Fruit-Growing in the Northwest, J. S. Harris says, in effect :

From the early settlement of the country many of the Eastern varieties succeeded for a time, but the winter of 1882 and 1883 destroyed trees by the thousands, totally annihilating hundreds of orchards of the old favorite varieties.

Ten or twelve years of successful replanting with supposed hardy varieties followed ; till, in the winter of 1885-'86 a disaster as serious the first overtook us. A summer drought and early frost had matured the growth. September, October, and half of November were wet and warm, starting a new growth. Winter shut down suddenly, was long and severe, and the deep snows prevented freezing of the ground.

Looking to the future, he feels great confidence that among the importations from Russia, or the originations of Gideon, a remedy will be found, and a safeguard provided against the recurrence of such a calamity.

William Selbie, writing from Deadwood, Dak., says :

I have quite an orchard planted at my ranch, and expect to have over a barrel of apples this year. I think this country, in the immediate vicinity of the hills, is admirably adapted to horticulture.

John C. Ferris, secretary Northern Iowa Horticultural Society, when at Bismarck, Dak., saw Tetofski and several hybrid crabs in fruit. In Minnehaha County, in southeastern Dakota, there are many trees of Oldenburg and Wealthy and some of Fall Queen (Haas) in bearing.

THE QUINCE.

The common Quince (*Cydonia vulgaris*) is indigenous in southern Europe and eastern Asia. It is said to have first attracted attention in the Island of Crete, from the ancient name of which its botanical title is derived. It is successful in New England, and westward to and including Michigan ; but even within the influence of the Great Lakes it is not successful to any considerable distance north of latitude 43°, while it succeeds but indifferently, if at all, west of Lake Michigan.

The Japan Quince (*Cydonia Japonica*) is similarly hardy, and is grown chiefly for its brilliant flowers, which appear very early in spring. There are several varieties, differing slightly in color ; some of which, when of mature age, fruit freely. The ripe fruit may be used like that of the common quince.

THE BLACK WALNUT.

The Black Walnut (*Juglans nigra*) is one of the largest of northern forest trees. Its limit northward is probably not much, if any, beyond latitude 44°, although it is being planted for timber and shelter even farther north. Reports from northern Wisconsin, Minnesota, and Dakota indicate that, in those regions, its permanent success must be regarded as problematical; dependent, possibly, upon a judicious selection of soil and aspect.

It is successful in southwestern Iowa; while in central Wisconsin it has been found to grow well for a few years and then fail. It is said to grow and fruit well in southern Minnesota, as well as in some portions of Dakota. It is found to be more satisfactory at the extreme north, when grown from northern seed, a fact that is believed to be true of plants generally.

The English walnut* (*Juglans regia*) is grown largely and with profit in some of the Pacific States, but fails at the East, and is too tender for the extreme North.

THE BUTTERNUT.

The Butternut (*Juglans cinerea*) has a somewhat more extended range northward than the black walnut. It is perfectly at home, if not actually indigenous, in Michigan up to latitude 45°, and is abundant as a forest tree in portions of southern Minnesota in that latitude. Although not supposed to be indigenous, it is successfully grown in portions of Iowa, and there seems good reason for the hope that it may be found successful as far north as the national boundary, possibly even farther.

THE HICKORY-NUT.

The genus *Carya* consists of several species, of which *Carya alba* is very widely distributed, and may be considered to be the Northern hickory-nut proper.

Carya sulcata, the Western shell-bark hickory, has a nut of large size, with a very hard, thick shell. It is indigenous from Pennsylvania to Illinois and Kentucky. In Michigan its extreme northern limit is reached in the third tier of counties in the lower peninsula.

Carya oliviformis, the Pecan, is said to be indigenous along the Mississippi River as far north as southern Iowa, which is believed to be its extreme limit northward.

Besides the foregoing, *Carya tomentosa*, the Mocker-Nut or white heart hickory; *Carya glabra*, the Pig-Nut or broom hickory, and *Carya amara*, the Bitter-Nut or swamp hickory, are indigenous and more or less common, although of little value save as useful timber. Their limit northward can not be said to be determined, save that Messrs. Wheeler and

* The proper name of this nut is *Madeira nut*, because it came originally from the island of Madeira, in Portugal, and is in no sense English.—H. E. VAN DEMAN.

Smith, in their Michigan Flora, remark that "No member of this family gets much north of latitude 43°."

In southern Minnesota, however, near the latitude of Saint Paul (45°), the hickory (*Carya alba*) and bitter-nut (*Carya amara*) are reported to be successful, probably as artificially planted trees.

THE CHESTNUT.

The American Chestnut (*Castanea vesca*) finds its northern limit in Michigan at about latitude 43°, although it is apparently hardy much farther north, probably throughout the lower and possibly in some portions of the upper peninsula.

West of Lake Michigan this tree is not known to exist as an indigenous growth, although when planted on suitable soils it proves hardy and successful.

Chinquapin (*Castanea pumila*) is a native of southern Pennsylvania and Ohio, and on south, and is only known farther north as an introduced curiosity.

The European or Spanish Chestnut (*Castanea vulgaris*) bears a much larger nut, though less sweet than the American. The tree is tender at the North and West, except in specially-favored localities.

The Japanese Chestnut is a comparatively recent introduction, apparently quite similar to the Spanish, although it is claimed to be an earlier bearer, with even larger fruit. It will no doubt prove tender, at least north of latitude 43°.

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